

## Introduction

Welcome to the Radiation Safety Licensure and Management (RS104) Course Material. This training is required for anyone who is requesting a Radiation License at UAB. This course intends to inform the Licensee and Alternate (if one is named) of their responsibilities.

## Objectives

After this course, the participant should be able to:

1. Apply for, obtain, and maintain a UAB Radioactive Materials License
2. Recognize and fulfill your responsibilities as a Licensee or Alternate
3. Train your Alternate if one is named
4. Train your staff to follow the guidelines outlined in the License and by the Radiation Safety Program.

## Nuclear Regulatory Commission (NRC)

Congress formed this agency in 1974, and its intentions are making sure that the radioactive materials used are for the benefit of civilians, people, workers, and the environment. The commission accomplishes this protection through the process of obtaining a license, inspections, and the implementation of various rules and regulations.

Radiation is naturally present in our surroundings, and depending on its use can be a positive or negative thing. Congress gave the NRC the task of providing the best protection levels from radioactive materials. The NRC requires every radioactive licensee to store and use their radioactive materials out of the way of the public and the environment.

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## Alabama Department of Public Health (ADPH)

The Alabama Department of Public Health receives its regulatory governance from the Atomic Energy Act of 1954 – Section 274. The NRC passes their management of radioactive materials to the state of Alabama by a written and signed agreement between the NRC, Governor, and the Chairman of the Commission.

### *Office of Radiation Control (ORC)*

The Office of Radiation Control (ORC) is a part of the ADPH. The ORC has four components:

1. Radioactive Materials Licensing
2. Radioactive Materials Compliance
3. X-Ray Compliance
4. Emergency Planning

This office intends to protect the public and environment from excessive amounts of radioactive materials by the licensing process, observations and providing educational classes on emergencies policies and procedures.

## UAB

The Radiation Safety Program (RSP) manages the use of radioactive isotopes and radiation producing machine on the UAB campus. The RSP:

- Performs licensing reviews of all applications for radioactive materials
- Ascertains whether or not applicants have adequate facilities and equipment for storing and using radioactive materials
- Ensures sufficient training and experience for themselves and personnel using radioactive materials under their supervision

## You

The radioactive material license granted by the RRSC authorizes a Licensee to conduct a radioactive materials use program. The license is valid provided that the investigator is a staff member of one of the departments, schools, or groups at UAB and has the approval of the appropriate department chairman, dean, or administrator to conduct such a program involving the receipt, possession, use, disposal, and transfer of radioactive materials.

## Your Lab

### Management

#### *Department Head*

#### **Extended Leave**

There may be times when the primary Licensee may be absent for an extended length of time. Should this happen, then the primary Licensee must obtain the written consent from the Alternate Licensee to supervise the primary's radioisotope program during his/her absence. If this is not done, these activities must cease during such absence.

The primary Licensee must also notify the Radiation Safety Program before an extended absence from the University if continuing radioisotope activities under the license.

### Licensee and Alternate

#### *Responsibilities*

The Licensee has many responsibilities since he or she must adhere to the conditions of the license as well as other rules and regulations. The Licensee and Alternate must:

1. Comply with the UAB Radiation Safety Procedures Manual, applicable regulations, and license conditions.
2. Provide and enforce the written laboratory safety procedures and the instruction of the supervised personnel.

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3. Require personnel to wear clean, buttoned laboratory coats and protective gloves while handling radioisotopes.
4. Make available properly operating radiation detection instruments, both bench and portable types, appropriate to detect the kind of radiation measured.
5. Procure all material, equipment, and posting needed in all facets of the radiation safety program.
6. Authorize purchase requisitions for radioisotopes only if they are of the type and chemical form authorized by the license, and the receipt of the order does not cause exceeded possession limits.
7. Maintain up-to-date records showing the receipt, use, disposal, and transfer of all radioactive material.
8. Conduct inventories of radioisotopes and sealed sources at times specified (usually every quarter) by the Radiation Safety Officer (RSO).
9. Secure all radioactive materials from unauthorized access and seizure.

### *Obtaining and Maintaining the License*

To obtain a Radioactive Materials License, contact Environmental Health and Safety (EHS) at (205) 934-2487.

The key to keeping a Radioactive Materials License is maintaining and adhering to the conditions stated in the license. The Licensee should be very familiar with what is stated in the license and who is ultimately responsible for the people, the radioactive materials, and the lab.

### **Authorized User**

“Authorized User” means persons authorized to use radioactive materials. The authorization to use these radioactive materials is given to UAB radioactive materials licensees or individuals working under their supervision.

## Lab Environment

### Postings, Labels, etc.

UAB radioisotope licensees and registrants of x-ray and particle accelerator equipment are responsible for posting areas and labeling equipment necessary to comply with the applicable regulations. The Radiation Safety Program is responsible for ensuring that UAB licensees and registrants meet with these requirements. Purchase the appropriate labels, and signs through the appropriate vendors.

### Forms

There are many forms that you could potentially be required to complete and submit while working with radioactive materials here at UAB. A list of the forms can be found [here](#).



If you have any questions about forms or exactly what's needed for submissions, contact the Department of Environmental Health and Safety (EHS) at (205) 934-2487.

## Compliance

### Auditing Process

Achieve compliance with radiation safety requirements through proper instruction and training of personnel, periodic radiation safety reviews, spot checks of laboratory operations, and proper enforcement actions to correct deficiencies noted during these safety checks. The overall goal is to gain complete compliance with the UAB Radiation Safety Procedures Manual, with the conditions of the radioactive materials licenses issued, and with the Alabama Rules for Control of Radiation.

The enforcement of radiation safety measures instituted within a licensee's radioactive materials program initially rests with the licensee. The results documented by the radiation safety review demonstrate whether licensees are successful in their attempts to do so.

## Citations

If an auditor finds an area that is contaminated, you will receive a citation letter. Make sure that all areas are free from contamination after working with radioactive materials. When auditors from the Radiation Safety Program visit for inspection (scheduled and unscheduled), they will perform their surveys.

We hope that you never receive a citation letter. However, should you receive one, you should respond as required. Any UAB Radiation Materials Licensee or Alternate not responding to citation letters may have his or her license terminated. The manual covers the escalated enforcement actions. If you have questions, contact the Radiation Safety Program at (205) 934-2487.

### *Example*

When a wipe test shows readings of 1,000 CPM above background:

- Declare the laboratory area contaminated
- Clean the area
- Perform another wipe test. Keep the results of this test in your files.
- Notify the EHS Radiation Safety Program immediately
- Require bioassays for all who were working at or near the area (if required by RSP)
- Investigate to determine significant causes and prevent future events

Refer to the Procedures Manual for more information.

## Training

### New Employee

The Licensee is required to notify the Radiation Safety Program of new employees or those employees new to working with radioisotopes. Once informing the Radiation Safety Program of the new employee, they will perform a Baseline Bioassay (if required), evaluate and complete training if necessary, and add the person to the license.

A new person, whether new to UAB or already working with unsealed radioisotopes, can be added to the license as a closely supervised authorized user. However, complete all training within three months. Meaning no individual is left alone while working with unsealed radioisotopes until completing all training.

### *Baseline Bioassays*

The UAB Radiation Safety Program (RSP) must evaluate the need for personnel monitoring (dosimetry) and radio-bioassays for all personnel who work with radioactive materials or exposure to producing machines. The use of radioactive materials does not necessarily require the need for dosimetry or bioassay. All staff who handle or otherwise work with radioactive materials must be authorized to do so under an established, approved UAB Radioactive Materials License that is in good standing or listed as a user of exposure producing machines through the appropriate Radiation Worker Registration. Additionally, no one is allowed to work with radioactive materials or radiation producing devices without proper radiation safety training. The person supervising must be an Authorized User on the license who has completed all required radiation safety training.

Only those personnel working with planned activities of certain radio-isotopes may be required to submit a bioassay (see UAB Bioassay Standard). To schedule a Bioassay, contact Physics Dosimetry Coordinator (205) 934-6214.

## Equipment

### Proper Shielding

Store all radioactive materials on the side of the room away from hallways, offices, and stairwells. Using sufficient shielding reduces radiation levels in these areas to 0.25 mRem per hour when measured at a distance of one foot from the walls in these areas. Maintain proper shielding for radioactive waste to limit whole-body exposure rates to 0.5 mRem per hour at one foot from waste containers.

### Meters/Badges

UAB and other institutions are required to keep records of the total effective radiation dose to individuals entering restricted areas who may receive 10% or more of the maximum permissible annual limits allowed by State of Alabama and Jefferson County regulations. To keep an accurate accounting of an individual's total radiation exposure, the UAB Radioisotope & Radiation Safety Committee requires individuals to utilize dosimetry as stated in their license or their work area.

## Waste Management

The process of identifying the contents of a shipment of hazardous materials through specific lists is known as the manifesting of hazardous materials. For radioactive waste shipments, the particular document used is the radioactive waste

transport manifest. This document serves multiple purposes, it identifies the radioactive materials and the chemical constituents by weight and certifies the radioactive wastes are packaged according to the requirements of the UAB Radioisotope and Radiation Safety Committee as set forth herein. A copy of the form to be utilized in completing this manifest can be found [here](#).

Note this policy applies only to radioactive solids, chemicals or biologicals. For non-radioactive chemicals or biologicals, refer to the UAB Chemical or Biosafety Manuals.



If you are responsible for handling and packing the radiation waste in your area, you are required to complete [Radiation Safety Waste Handling and Packing \(RS105\)](#).



## Emergencies

In the event of an emergency involving a radiation source, your contacts are:

1. Normal working hours, the Radiation Safety Program - 934-4751
2. Off-duty hours and on holidays, UAB Paging - 934-3411 (ask to have the Health Physicist On-Call paged at 7746, the Radiation Safety Officer, or the Assistant Radiation Safety Officer.)

## Inventory

Your inventory must be submitted online each quarter. An annual calendar with these dates marked is available on the EHS website but mark your calendars as well. Inventory due dates are the following each year March 27<sup>th</sup>, June 27<sup>th</sup>, September 27<sup>th</sup>, and December 27<sup>th</sup>. You have a grace period of 14 days (including weekends and holidays). The count starts the day after the 27<sup>th</sup> of the month. If your online inventory form is not submitted by the end of the day when the grace period ends, it is late, and a citation is issued. If you are out of the office when the grace period ends and you have not submitted your quarterly inventory, you will still receive a citation for a late submission.

### No Inventory?

Remember to submit the online inventory form each quarter even if you have no radioactive materials to report. If you have no radioactive materials to report and wish to keep the license active, there is a place on the form to indicate no radioactive materials. Failure to submit an online inventory form could result in the termination of the license.

## Renovations or Moving

When renovating or moving, the Licensee must submit the changes to the Radiation Safety Program and wait for approval! Request an amendment in writing which includes any change you wish reflected on your radioactive materials license and include room diagrams of the new room or room changes if applicable.

## Decommissioning

Decommissioning, or permanently closing the lab, is a responsibility of the Licensee or the Alternate. There are severe repercussions if you abandon a lab at UAB. If you are the primary Licensee and plan on leaving UAB permanently, you must notify the Radiation Safety Program at least one month before terminating employment at UAB ensuring that adequate arrangements are made for the transfer or disposal of all radioisotopes in the licensee's possession. Performing a wipe test after transferring or removing everything radioactive from the laboratory verifies nothing in the room is radioactive.

## As Low As Reasonably Achievable (ALARA)

The occupational doses received by laboratory radiation workers are usually far below the doses which would induce any acute effects from the radiation. However, because of the uncertainties existing with any individual radiation dose,

occupationally-exposed individuals should always strive to keep their exposures As Low As Reasonably Achievable (ALARA). The significant three exposure reducing tools are time, distance, and shielding. To reduce your amount of exposure:

- Spend less time near the radiation source.
- Move farther away from the radiation source
- Use the appropriate shielding for the radiation source.
- Use the proper shielding - whether it's Plexiglas, lead bricks or pigs, a lead apron, or a combination.



Perform a wipe test if you are using 3H and 14C. A Geiger Counter cannot detect 3H and is unreliable to detect 14C. Therefore, a wipe test must be performed for both.

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Just remember, when shielding radioactive materials, shield first for beta radiation with Plexiglas or other appropriate material, and then shield second for gamma radiation with lead of proper thickness. Perform a mandatory documented Area Survey (a wipe test) within seven days after using radioactive materials. Abide by established safety and security procedures, as listed on the license and in the procedures manual. Never take shortcuts when working with radioisotopes! It only takes a second for an accident to happen and change a life forever. Everyone is responsible when it comes to ensuring the health and safety of those in the lab. Follow the ALARA principles stated here to stay safe when working with radioisotopes.

### Security

The Alabama rules for radiation control require sources of radiation in any unrestricted area shall be tended under the constant surveillance and immediate control of the license. All radioactive materials must be safely secured in the lab when no one is present.

### Conclusion

This concludes the Radiation Licensure and Management (RS104) Course Material. Please take the assessment at this time. 90% or higher is required to pass.

You should schedule an interview to discuss your license with the Radiation Safety Program via e-mail or phone call within ten days of completing the online portion of this course. The interview will take place in your area.

### Want to Learn More?

EHS has many training courses available to all UAB active employees and students. This includes topics such as radiation training, biosafety, bloodborne pathogens, chemical safety, controlled substances, building life safety, hazardous and medical waste, universal waste, PPE, hazard communication, etc.

We have a [decision tree](#) to assist you in choosing the right course to match the knowledge/skills you may need at work every day as well. If you have any questions or comments, contact EHS at (205) 934-2487.