Introduction

Welcome to the Radiation Safety Licensure and Management (OHS_RS104) training course. This training is designed and **required** for anyone who is requesting a Radiation License at UAB. The intent of this course is to inform the Licensee and Alternate (if one has been named) of their responsibilities. Since there are regulations governing work with radioactive materials, the Licensee must work closely with lab staff to ensure the utmost level of safety. This training is based on regulations from the Federal, State, and local level.

Objectives

At the conclusion of this course, the participant should be able to:

1. Apply for and obtain an UAB Radioactive Materials License
2. Maintain an UAB Radioactive Materials License
3. Recognize and fulfill his/her responsibilities as a Licensee or Alternate
4. Train his/her Alternate if one is named
5. Train his/her staff to follow the guidelines set forth in the License and by the OH&S Radiation Safety Program.

Nuclear Regulatory Commission (NRC)

This agency was formed by Congress in 1974. The intent of this agency is to make sure that radioactive materials are being used 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 can be naturally present in our surroundings, and depending on how it is being used 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.

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 governance 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 parts:

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

The intent of this office is to protect the public and environment from excessive amounts of radioactive materials. This protection is completed by the license process, observations, and providing training/educational classes on emergencies policies and procedures.

UAB

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

- performs a licensing review of all applications for the use of radioactive materials
- ascertains whether or not applicants have adequate facilities and equipment for storing and using radioactive materials
- ensures adequate training and experience for themselves and for 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 OH&S Radiation Safety Program **prior** to an extended absence from the University if radioisotope activities will continue to be conducted under the license.

Licensee/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 major points have been covered here.

1. If an Alternate has been named and is listed on the license, then he or she has the same responsibilities as the Licensee.
2. The Licensee and the Alternate must comply with the UAB Radiation Safety Procedures Manual, applicable regulations, and license conditions.

3. The Licensee and the Alternate must provide and enforce the written laboratory safety procedures and the instruction of the supervised personnel.
4. The Licensee and the Alternate must require personnel to wear clean, buttoned laboratory coats and protective gloves while handling radioisotopes.
5. The Licensee and the Alternate must make available properly operating radiation detection instruments, both bench and portable types, appropriate to detect the type of radiation being measured.
6. The Licensee and the Alternate must procure all material, equipment, and posting needed in all facets of the radiation safety program.
7. The Licensee and the Alternate must authorize/approve purchase requisitions for radioisotopes **only if**:
    a. they are of the type and chemical form authorized by the license, and
    b. the receipt of the order does not cause possession limits to be exceeded.
8. The Licensee and the Alternate must maintain up-to-date records showing the receipt, use, disposal, and transfer of all radioactive material.
9. The Licensee and the Alternate must conduct inventories of radioisotopes and sealed sources at times specified by the Radiation Safety Officer (RSO). This is usually done on a quarterly basis.
10. The Licensee and the Alternate must secure all radioactive materials from unauthorized access and seizure.
11. The Licensee and the Alternate must carry out all of these responsibilities and more. But remembering every one of these on a day-to-day basis might be a problem. On the OH&S website there is a PDF file of the **Responsibilities of Licensees and Alternates**.

Obtaining and Maintaining the License

To obtain a Radioactive Materials License, please call Occupational Health and Safety at 205-934-2487.

The key to keeping a Radioactive Materials License is to maintain and adhere to the conditions stated in the license. The Licensee should be very familiar with what is stated in the license. This is the person 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 to 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 as is necessary to comply with the applicable regulations. The Radiation Safety Program is responsible for ensuring that UAB licensees and registrants comply with these requirements. The appropriate labels and signs should be purchased 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 a form or exactly what you need to submit, please contact the Department of Occupational Health and Safety at 205-934-2487.

Compliance

Auditing Process

Compliance with radiation safety requirements can be achieved through proper instruction and training of personnel, periodic radiation safety audits, 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 audit 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 OH&S Radiation Safety Program visit for inspection (scheduled and unscheduled), they will perform their own 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 and/or Alternate who does not respond to citation letters **may have his or her license terminated.**

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The manual covers the escalated enforcement actions. If you have questions, please call the OH&S 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 OH&S Radiation Safety Program immediately.
- Require bioassays for all who were working at or near the area.
- 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 OH&S Radiation Safety Program of new employees or those employees new to working with radioisotopes.

Once the OH&S Radiation Safety Program has been informed of the new employee, they will:

- Perform a Baseline Bioassay,
- 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, all training must be completed within three months.

This means that this person MUST NOT be left alone while working with unsealed radioisotopes until all training has been completed.

The person supervising MUST be an authorized user on the license who has completed all required radiation safety training.

Baseline Bioassays

Baseline Bioassays Required!

Since natural radiation exists in everyday life, new employees or those new to working with or around radioactive materials are required to have a baseline, or pre-operational, bioassay performed.

This allows the OH&S Radiation Safety Program to know exactly how much radiation is already a part of the person's body so that **if** he or she should be internally contaminated, OH&S would be able to determine the difference in those two amounts.

No one should be working with unsealed radioisotopes without having a baseline bioassay on file! To do so is a **violation of the regulations.**

To schedule bioassays, contact the OH&S Radiation Safety Program at 205-934-2487.

Equipment

Proper Shielding

All radioactive materials should be stored on the side of the room away from hallways, offices and stairwells. Sufficient shielding must be used to reduce 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. Proper shielding must be

Meters/Badges

maintained for radioactive waste in order to limit whole body exposure rates to 0.5 mRem per hour at one foot from waste containers.

UAB and other institutions are required to keep records of the total effective radiation dose to individuals entering restricted areas who may receive 10 percent or more of the maximum permissible annual limits allowed by State of Alabama and Jefferson County regulations. In order to keep an accurate accounting of an individual's total radiation exposure, the UAB Radioisotope & Radiation Safety Committee finds it necessary to requires individuals to utilize dosimetry as stated in their license or in 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 specific document used is known as the radioactive waste transport manifest. This document serves multiple purposes, it: (1) identifies the radioactive materials, (2) identifies the chemical constituents by weight and (3) certifies that the radioactive wastes have been 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**.

It should be noted that 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 plan on or have been assigned to be the one handling the radiation waste in your area, you are **required** to complete the Radiation Safety Waste Handling and Packing Course (RS1004).

Emergencies

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

1. During normal working hours, the Radiation Safety Program - 934-4751
2. During 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 OH&S website, but mark your **own calendars** as well.

Inventory due dates are the following **each year**:

- March 27th
- June 27th
- September 27th
- December 27th

You have a **grace period of 14 days**. The count starts the day after the 27th of the month.

Weekends and holidays **ARE** included in the 14 day count!

If your online inventory form is **NOT** submitted by the end of the day when the grace period ends, it is considered **LATE,** and a citation will be 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/Moving

When renovating or moving, the Licensee must submit the changes to the OH&S 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 and/or the Alternate. There are serious repercussions if a lab is abandoned at UAB.

If you are the primary Licensee and plan on leaving UAB permanently, you **MUST** notify the OH&S Radiation Safety Program at least one month prior to terminating employment at UAB. This is to ensure that adequate arrangements are made for the transfer and/or disposal of all radioisotopes in the licensee's possession.

Perform a wipe test after transferring or removing everything radioactive from the laboratory. This must be done to verify that 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 that exist with any individual radiation dose, occupationally-exposed individuals should always strive to keep their exposures As Low As Reasonably Achievable. The acronym is ALARA.

The big 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.

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 appropriate thickness.

Perform a mandatory documented Area Survey (a wipe test) within seven days after using radioactive materials.

A wipe test **MUST** be performed 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.

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

Since 2001, increased emphasis is placed on the security of radioactive materials by regulatory agencies, such as the Nuclear Regulatory Commission (NRC).

The Alabama rules for Radiation Control require that stored:

- sources of radiation be secured to prevent unauthorized removal; and
- sources of radiation shall be tended under the constant surveillance and immediate control of the Licensee.

UAB, in accordance with these rules and regulations, requires that radiation storage facilities must be kept locked and labeled at all times.

Also, **ALL** radioactive materials must be safely secured in the lab when no one is present.

Conclusion

This concludes the online portion of the Radiation Licensure and Management course. Please take the assessment at this time. 90% or higher is required to pass.

You make take the assessment one time. If you fail, you will fail the course and have to take it again.

An interview to discuss your license must be scheduled with the OH&S Radiation Safety Program via e-mail or phone call within 10 days of completing the online portion of this course. The interview will take place in your area.

For further assistance or information contact The Department of Occupational Health and Safety (OH&S) at 205-934-2487, or you can visit the OH&S **website**.

Want to Learn More?

OH&S has many training courses available to all UAB active employees and students. This includes topics such as in depth 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, please feel free to contact OH&S.