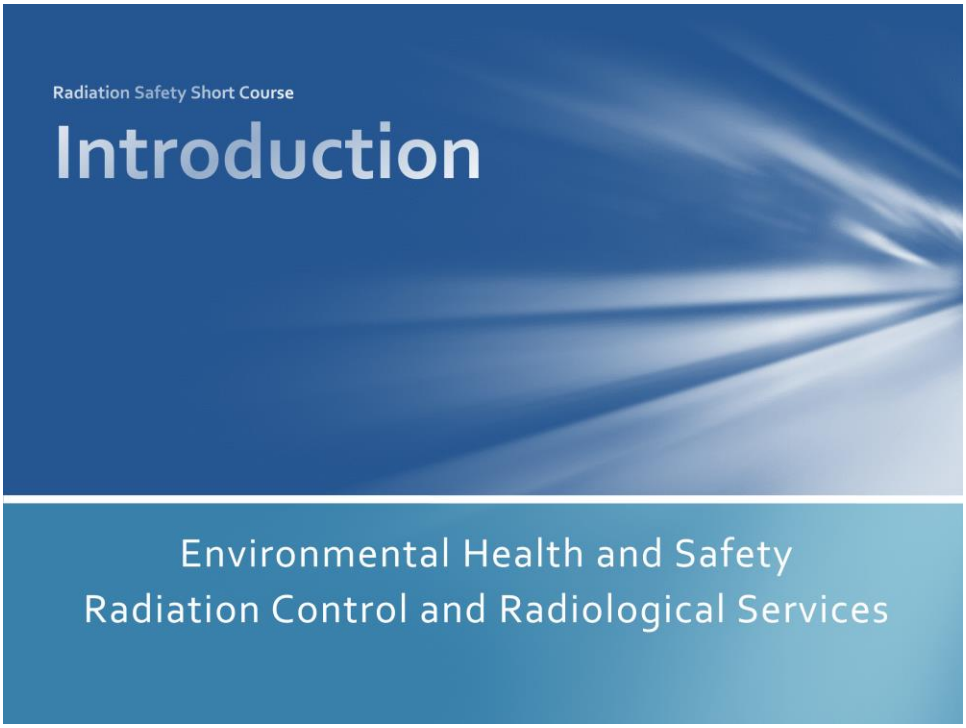
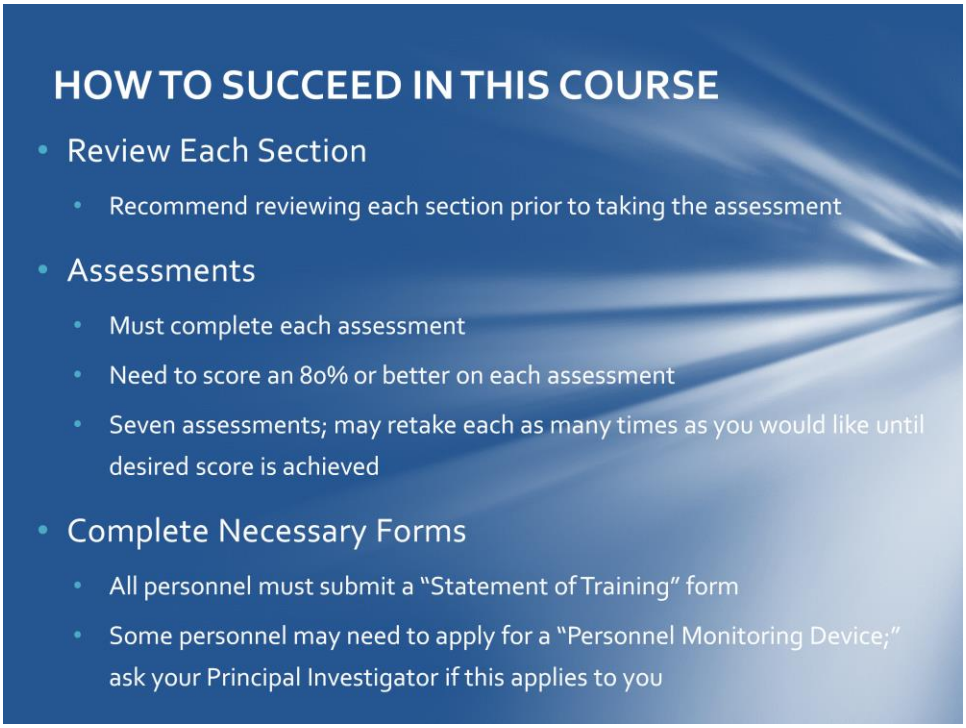
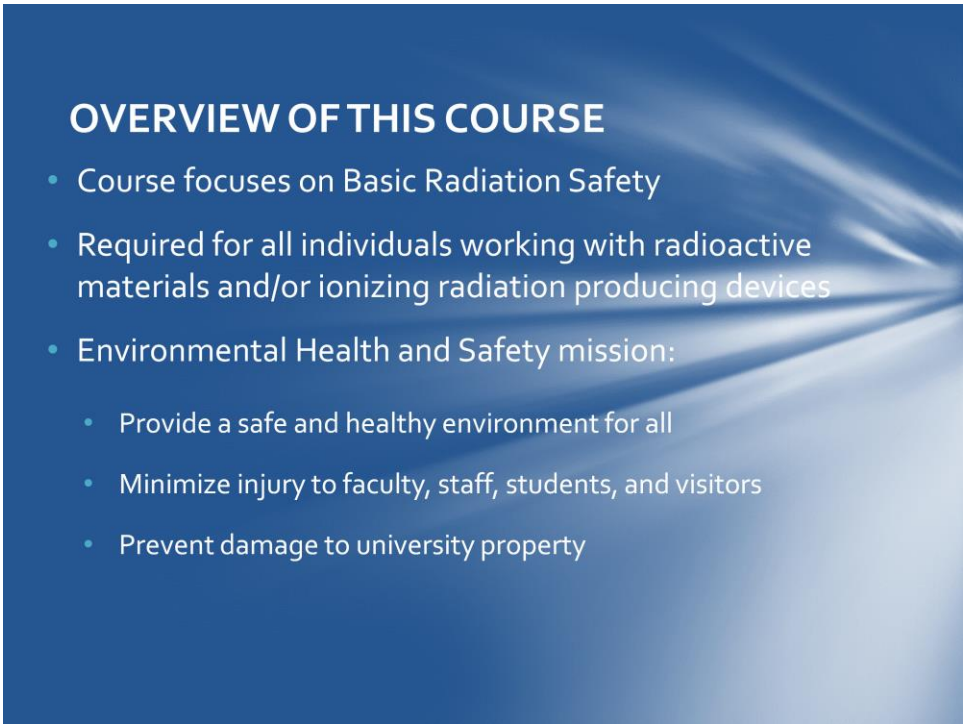


Welcome to the University of Florida Radiation Safety Short Course presented by Environmental Health and Safety's Radiation Control office.



Basics on how to be successful in this course: I recommend that you review each section prior to taking the assessment. You will become familiar with the concepts and be much more successful on your first attempt.
There are seven assessment in total. You must complete each assessment with a score of 70% or better. You may retake each one as many times as you would like until you achieve your desired score.
Once you have successfully completed all of the assessments and received your Congratulations certificate then you will be required to submit a Statement of Training form, otherwise known as an RC-1 form. If a Personnel Monitoring Device is required by your Principal Investigator, then you will need to complete the Personnel Monitoring Device form and submit it to the Radiation Safety office.



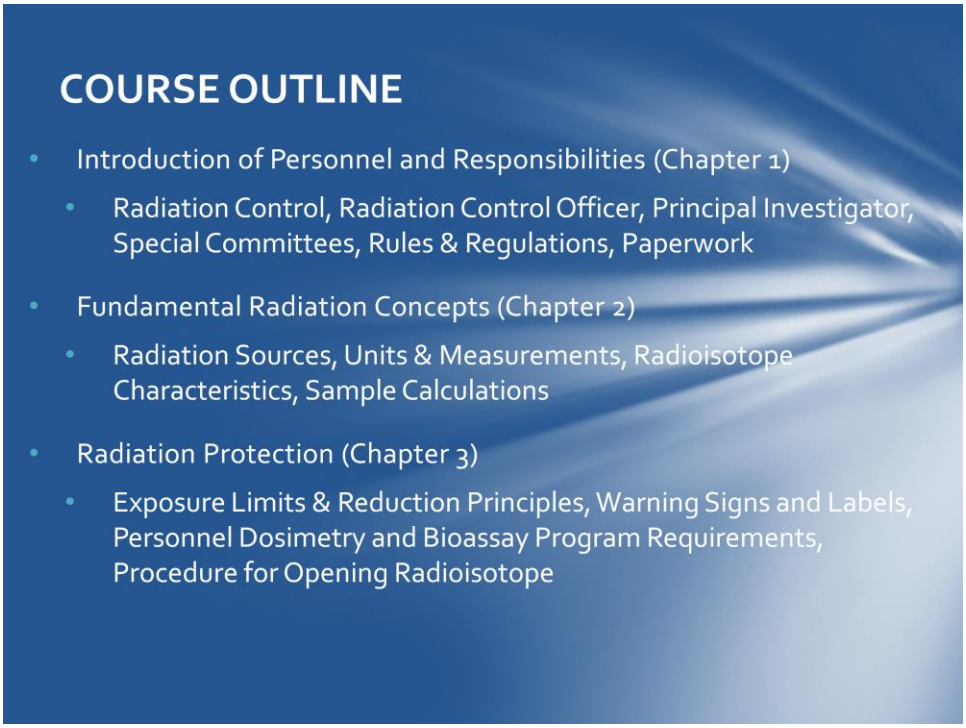
An overview of this course: it focuses on basic radiation safety; it is required for all individuals who will be working with radioactive materials and or ionizing radiation producing devices.
Our mission with this course is to provide a safe and healthy environment for all; to minimize injury to faculty, staff, students, and visitors as well as prevent any damage to university property.

OVERVIEW OF THIS COURSE

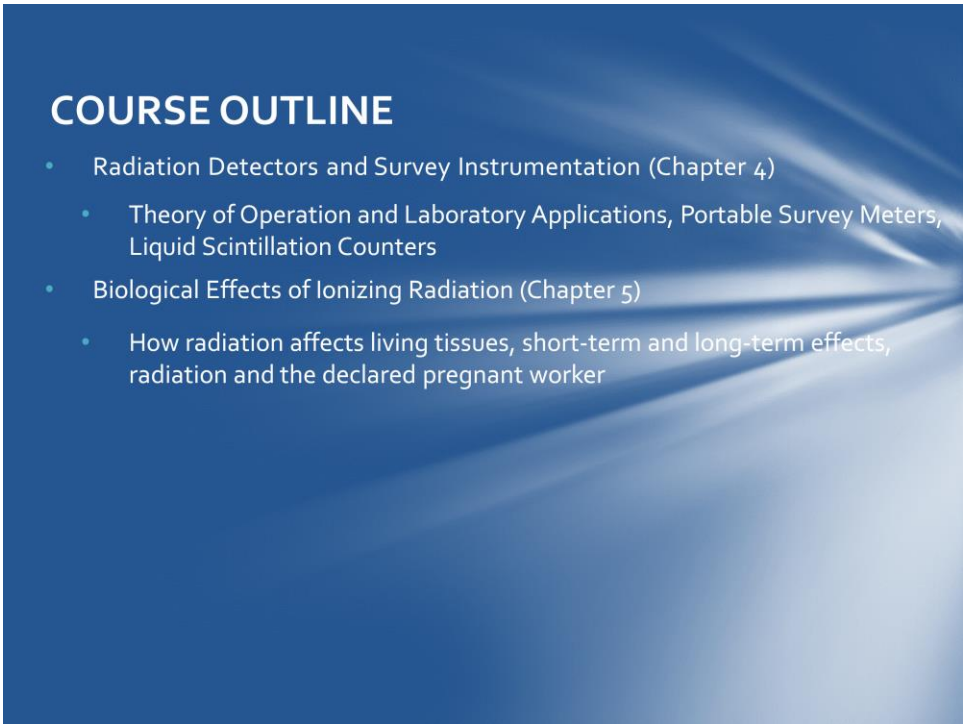
- What you *will not* learn in this course:
  - No hands on training!
- What you *will* learn in this course:
  - Techniques for safe handling of radioactive materials
  - Radiation detection instrumentation and safety equipment
  - Guidelines and regulations

What you will not learn in this course: we are not providing hands on training. This will be done by you PI or the lab manager.
What you will learn in this course: We will provide you with techniques for safe handling of radioactive materials,; we will provide information and instruction on radiation detection instrumentation and safety equipment used in the labs; and we will provide you with guidelines and regulations for radioactive material use here at UF.

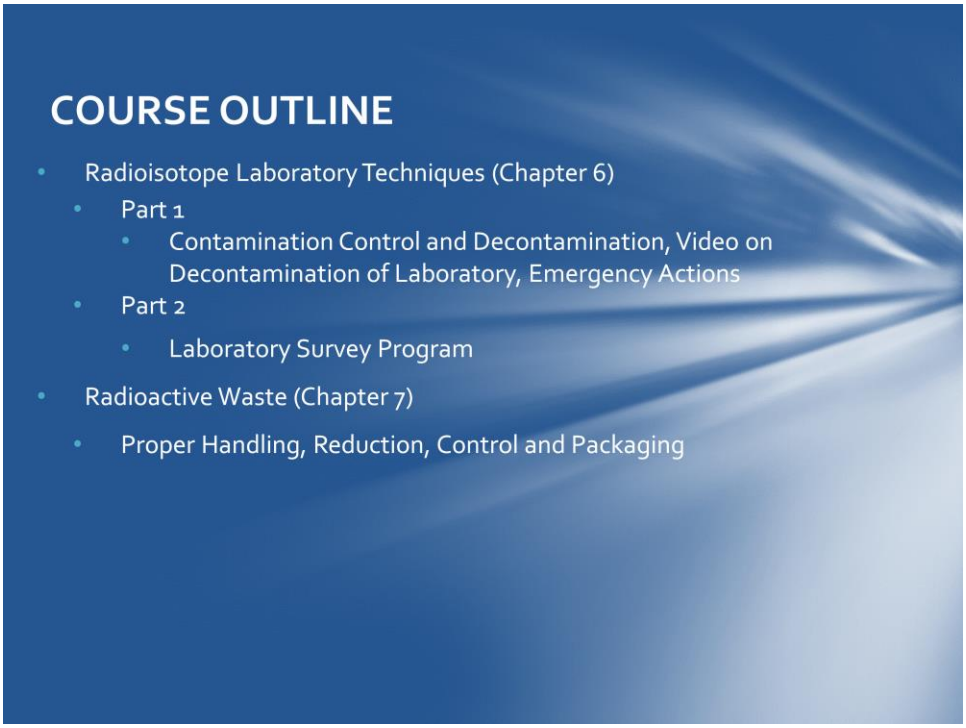
As a note, there are several means for becoming an authorized user of radioactive material at UF: either by taking this short course, by taking formal university credited courses, on-the-job training by your PI, or by documented training from another university of approved institution.



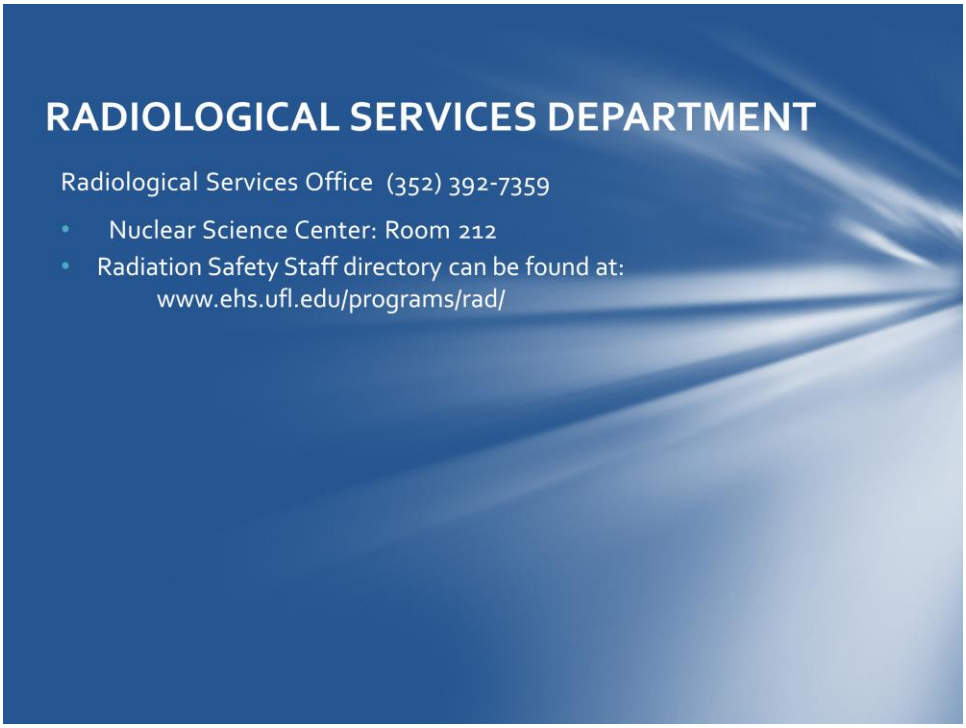
This course is composed of seven chapters (or sections). This is the Introduction in which you will become familiar with Radiation Control personnel and their responsibilities, the principal investigator's responsibilities, special committees here at UF, the rules and regulations that dictate what and how we conduct radiation control here at UF, and necessary paperwork.
Chapter 2 will introduce you to Fundamental Radiation Concepts. Sources of radiation, units and measurements, characteristics of isotopes, and then sample calculations.
Chapter 3 will review exposure limits and reduction principles, warning signs and labels, personnel dosimetry and bioassay program requirements. You will also become familiar with procedures for opening isotope containers.



In Chapter 4 we will learn about radiation detectors and survey instrumentation used in labs. You will become familiar with various portable survey meters and sample counters used for documenting survey results.
Chapter 5 will provide you with information on the biological effects of ionizing radiation. You will learn how radiation affects living tissues, short-term and long-term effects, and radiation and the declared pregnant worker.



Chapter 6 includes a video on that demonstrates proper and improper lab procedures. You will also become familiar with the radiation control lab survey program and what is required of lab personnel.
And finally, Chapter 7 will provide you with proper handling, reduction methods, control and packaging of radioactive waste.



Radiation Safety has two offices on campus, the main office is located at the Nuclear Science Center, Room 212. Our office phone number is 352-392-7359. My name is Susan Stanford and I am the Radiation Safety Officer here at UF.

Our other office is located close to UF Health and the Health Science Center, it is located on the ground floor of the Dental Tower, in DG-11. The phone number there is 352-392-1589. Les Hines, Health Physicist and instructor is located there and Cathy Sharp, your point of contact for anything involving this course is also located there.

Hazardous Materials Management, located in the Surge Area is where the waste management office is located, their phone number is 352-392-8400. James Fleetwood, EH&S Specialist and instructor is there to assist.

The University of Florida Radiation Protection Program…

The University of Florida is regulated first by the Nuclear Regulatory Commission (the NRC).

FEDERAL REGULATIONS

UNITED STATES NUCLEAR REGULATORY COMMISSION
RULES and REGULATIONS
TITLE 10, CHAPTER I, CODE OF FEDERAL REGULATIONS—ENERGY

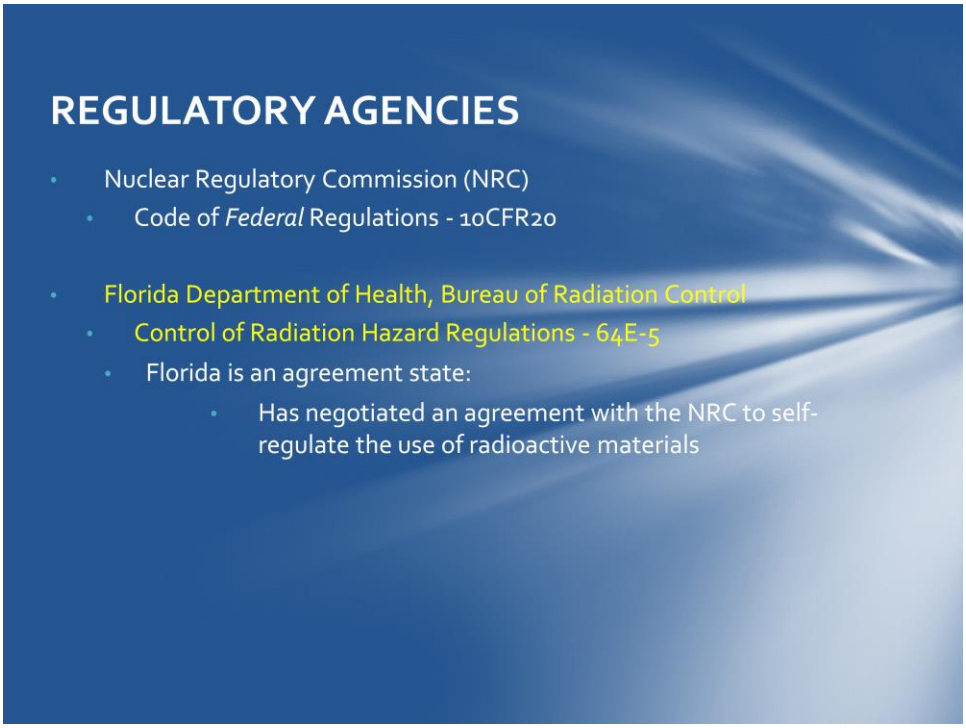
PART 20

STANDARDS FOR PROTECTION AGAINST RADIATION

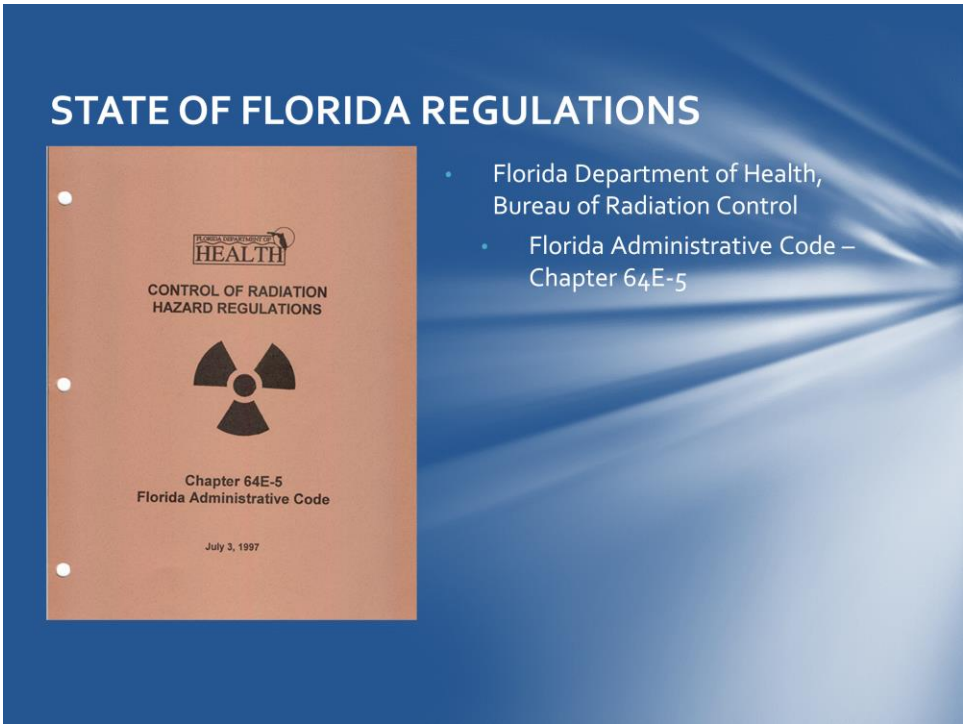
NRC

- Code of *Federal* Regulations - 10CFR20

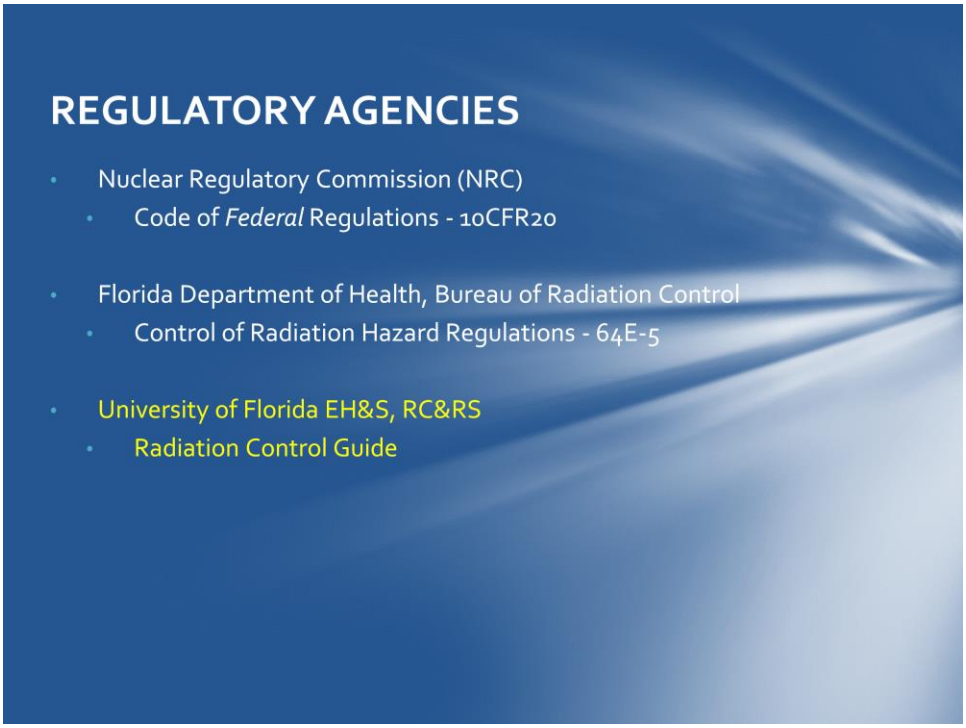
The regulations specific to radiation protection (Standards for protection against radiation) can be found in the Code of Federal Regulations, 10CFR20.



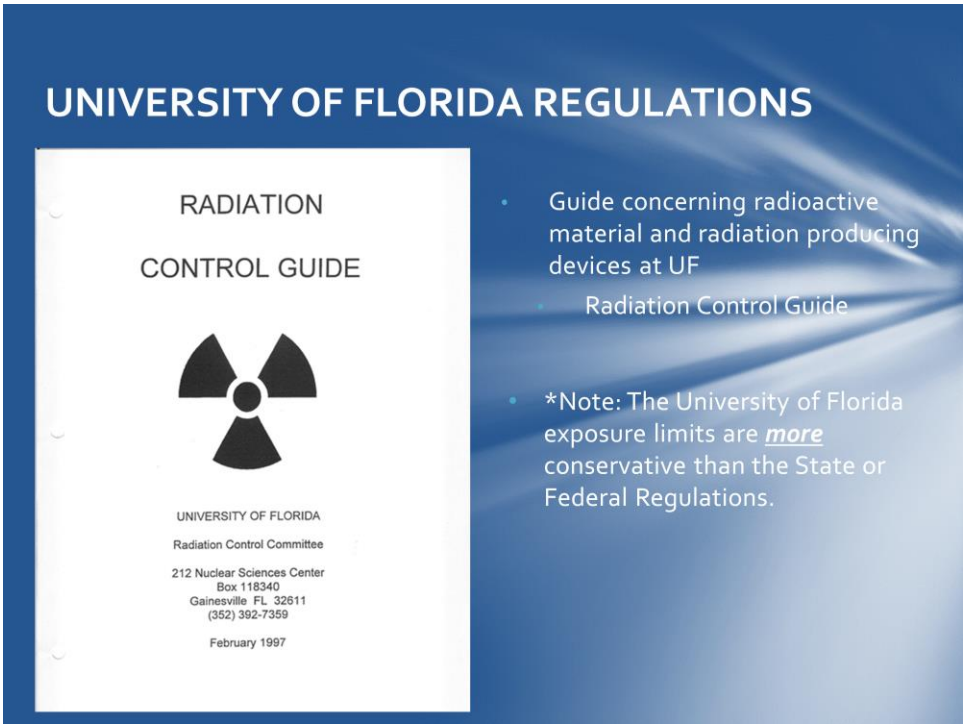
And since Florida is an Agreement State (meaning that Florida has negotiated an agreement with the NRC to self-regulate the use of radioactive materials), UF is also regulated to the Florida Department of Health, Bureau of Radiation Control.



The Florida Administrative Code, Chapter 64E-5 is the Control of Radiation Hazard Regulations.

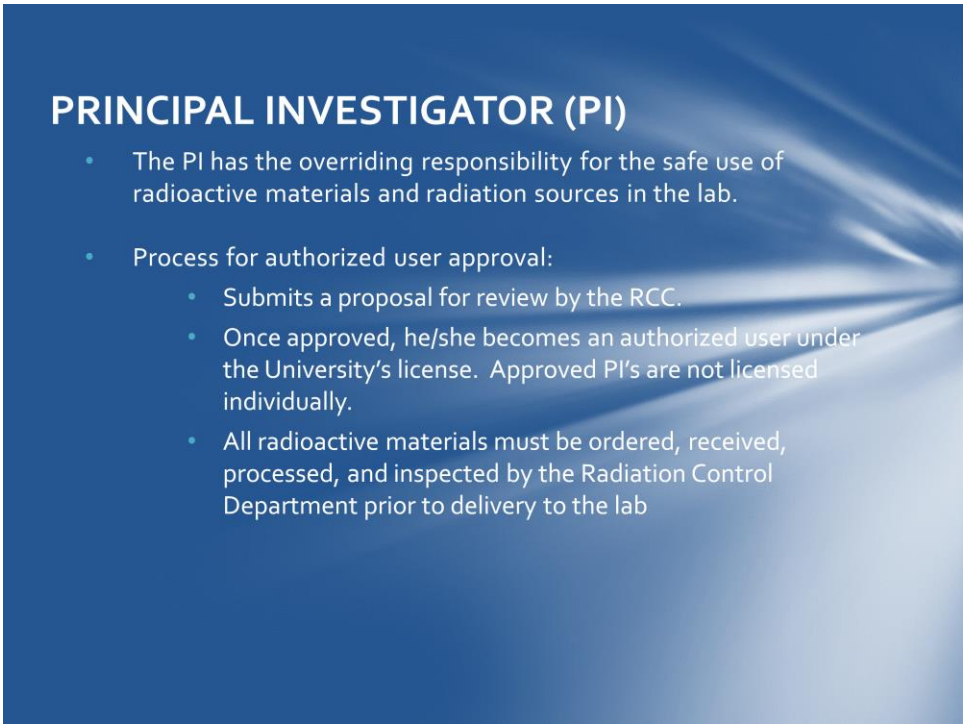


Based on the NRC and Florida department of health regulations, the university of Florida, EH&S Radiation Control office has developed a Radiation Control Guide.

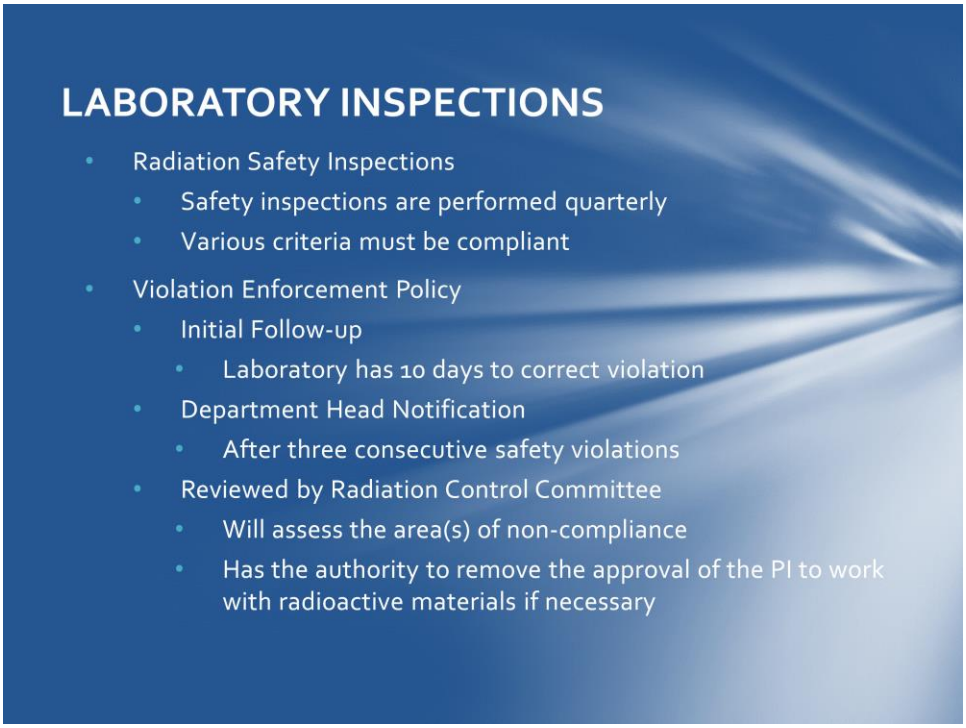


The radiation control guide provides Principal investigators and lab personnel guidance concerning radioactive material and radiation producing devices at UF. One thing that should be noted is that the University of Florida exposure limits are more conservative than the State of Federal Regulations.

As required by the regulatory agencies, UF has established two special committees to oversee the use of radioactive materials and radiation producing devices. The Radiation Control Committee is comprised of faculty and staff from around campus and meets on a quarterly basis. They review and approve all uses of radioactive material on campus. The Human Use Committee is comprised of faculty and staff from UF and UF Health. They too meet on a quarterly basis. The HURRC only reviews and approves use of radiative material or radiation producing devices on humans.



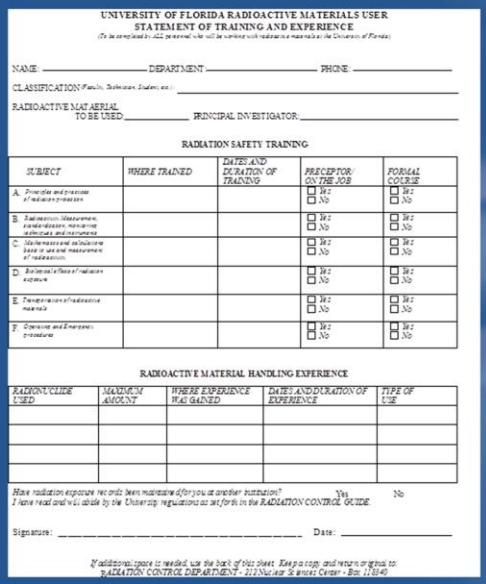
Principal Investigators, they have the overriding responsibility for the safe use of radioactive materials and radiation producing source in their labs. PI's must first submit a proposal to the Radiation Control Committee prior to use. Once they are approved by the committee then they are granted authorized user status under the university's broad scope license. (PI's are not licensed individually.) All radioactive material must be ordered, received, processed and inspected ty radiation control prior to delivery to the lab.



Radiation Control completes quarterly safety inspections of each lab that is authorize for use of radioactive material. During these inspections we are ensuring compliance with UF requirements.
UF does have a Violation Enforcement Policy. Principal investigators has 10 days to correct any violations. After three consecutive safety violations the Department Head is notified. If there is still noncompliance, the Radiation control committee with review the actions. If necessary, the committee has the authority to remove the approval of the PI and lab personnel to work with radioactive material.

Special forms and necessary paperwork

STATEMENT OF TRAINING (RC-1 FORM)



UNIVERSITY OF FLORIDA RADIOACTIVE MATERIALS USER
STATEMENT OF TRAINING AND EXPERIENCE

(To be completed by ALL personnel who will be involved with radioactive materials at the University of Florida)

NAME: _____ DEPARTMENT: _____ PHONE: _____

CLASSIFICATION *(Faculty, Technician, Student, etc.)*: _____

RADIOACTIVE MATERIAL TO BE USED: _____ PRINCIPAL INVESTIGATOR: _____

RADIATION SAFETY TRAINING

SUBJECT	WHERE TRAINED	DATES AND DURATION OF TRAINING	PRECEPTOR/ ON THE JOB	FORMAL COURSE
A. *Principles and practices of radiation protection*			☐ Yes ☐ No	☐ Yes ☐ No
B. *Radioactivity, measurement, standardization, monitoring techniques, and instruments*			☐ Yes ☐ No	☐ Yes ☐ No
C. *Mathematics and calculations basic to use and measurement of radioactivity*			☐ Yes ☐ No	☐ Yes ☐ No
D. *Biological effects of radiation exposure*			☐ Yes ☐ No	☐ Yes ☐ No
E. *Transportation of radioactive materials*			☐ Yes ☐ No	☐ Yes ☐ No
F. *Operating and Emergency procedures*			☐ Yes ☐ No	☐ Yes ☐ No

RADIOACTIVE MATERIAL HANDLING EXPERIENCE

RADIONUCLIDE USED	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DATES AND DURATION OF EXPERIENCE	TYPE OF USE

Have radiation exposure records been maintained for you at another institution? Yes No

I have read and will abide by the University regulations as set forth in the RADIATION CONTROL GUIDE.

Signature: _____ Date: _____

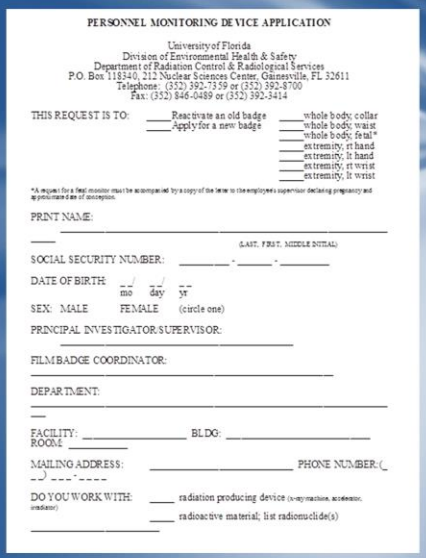
If additional space is needed, use the back of this sheet. Keep a copy and return original to: RADIATION CONTROL DEPARTMENT - 217 Nuclear Sciences Center - Box 118340

- Department:
- Radioactive Material:
  - Specify
- Principal Investigator:
- Where trained:
  - RSSC
- Preceptor/on the job:
  - No
- Formal Course:
  - Yes

Once you have successfully completed all of the assessments, then you must complete the Statement of Training form. You will need to specify the Department, Radioactive Material to be used, the principal investigator, where you were trained (Radiation Safety Short Course).

PERSONNEL MONITORING DEVICES

- Principal Investigator:
- Film Badge Coordinator:
- Department:



PERSONNEL MONITORING DEVICE APPLICATION

University of Florida
Division of Environmental Health & Safety
Department of Radiation Control & Radiological Services
P.O. Box 118340, 212 Nuclear Sciences Center, Gainesville, FL 32611
Telephone: (352) 392-7359 or (352) 392-8700
Fax: (352) 846-0489 or (352) 392-3414

THIS REQUEST IS TO: ____Reactivate an old badge ____Apply for a new badge

____whole body; collar
____whole body; waist
____whole body; fetal*
____extremity; rt hand
____extremity; lt hand
____extremity; rt wrist
____extremity; lt wrist

*A request for a fetal monitor must be accompanied by a copy of the letter to the employee's supervisor declaring pregnancy and approximate date of conception.

PRINT NAME: _____
(LAST, FIRST, MIDDLE INITIAL)

SOCIAL SECURITY NUMBER: ___-___-___

DATE OF BIRTH: __/__/__ (mo day yr)

SEX: MALE FEMALE (circle one)

PRINCIPAL INVESTIGATOR/SUPERVISOR: _____

FILM BADGE COORDINATOR: _____

DEPARTMENT: _____

FACILITY: _____ BLDG: _____ ROOM: _____

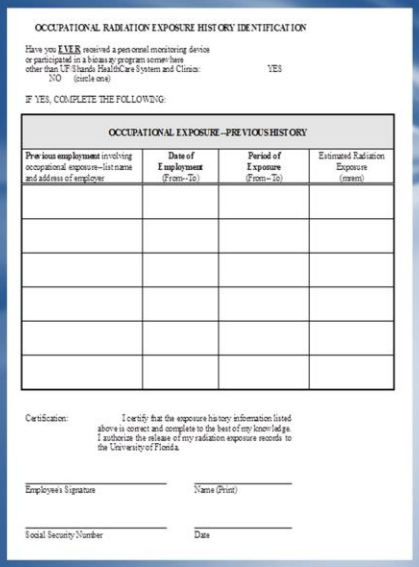
MAILING ADDRESS: _____ PHONE NUMBER: (__) ___-____

DO YOU WORK WITH: ____ radiation producing device (x-ray machine, accelerator, sealed)
____ radioactive material; list radionuclide(s)
_____

If your principal investigator has indicated that personnel monitoring devices are required then complete the appropriate application. It is important that you indicate the correct PI, the film badge coordinator (the person who you will receive the badge from in the department), and the department. It is extremely important that you wear these badges properly and that you return them as requested.

EXPOSURE HISTORY

If you were monitored at another facility or university, you must complete this form.



OCCUPATIONAL RADIATION EXPOSURE HISTORY IDENTIFICATION

Have you **EVER** received a personal monitoring device or participated in a bioassay program somewhere other than UF/Shands HealthCare System and Clinics: YES NO (circle one)

IF YES, COMPLETE THE FOLLOWING:

OCCUPATIONAL EXPOSURE--PREVIOUS HISTORY			
Previous employment involving occupational exposure--list name and address of employer	**Date of Employment** (From--To)	**Period of Exposure** (From--To)	Estimated Radiation Exposure (mrem)

Certification: I certify that the exposure history information listed above is correct and complete to the best of my knowledge. I authorize the release of my radiation exposure records to the University of Florida.

Employee's Signature _____ Name (Print) _____

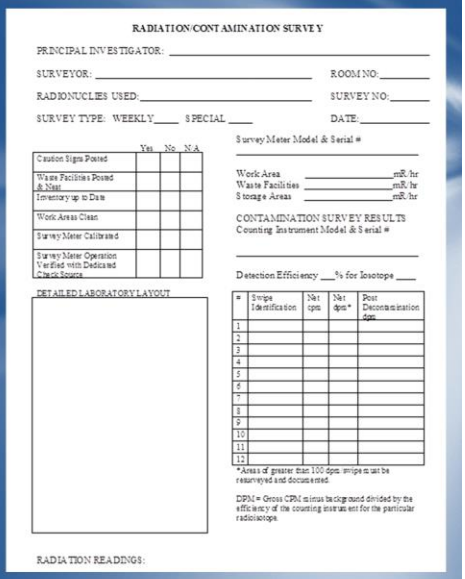
Social Security Number _____ Date _____

If you were monitored at another facility or university you must complete the Occupational Radiation Exposure History form in order for us to request your dose history. This form must be returned to the radiation control office.

LABORATORY SURVEYING AND MONITORING

Routine Surveying:

- Required within seven (7) days of radioactive material usage
- Required once a month if radioactive materials or waste is being stored in the lab



RADIATION/CONTAMINATION SURVEY

PRINCIPAL INVESTIGATOR: _____

SURVEYOR: _____ ROOM NO:_____

RADIONUCLIES USED:_____ SURVEY NO:_____

SURVEY TYPE: WEEKLY____ SPECIAL ____ DATE:_____

	Yes	No	N/A
Caution Signs Posted			
Waste Facilities Posted & Near			
Inventory up to Date			
Work Areas Clean			
Survey Meter Calibrated			
Survey Meter Operation Verified with Dedicated Check Source			

Survey Meter Model & Serial #

_____

Work Area _____mR/hr
Waste Facilities _____mR/hr
Storage Areas _____mR/hr

CONTAMINATION SURVEY RESULTS
Counting Instrument Model & Serial #

_____

Detection Efficiency ___% for Isotope ___

DETAILED LABORATORY LAYOUT

#	Swipe Identification	Net cpm	Net dpm*	Post Decontamination dpm
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

*Areas of greater than 100 dpm swipe must be resurveyed and documented.

DPM = Gross CPM minus background divided by the efficiency of the counting instrument for the particular radioisotope.

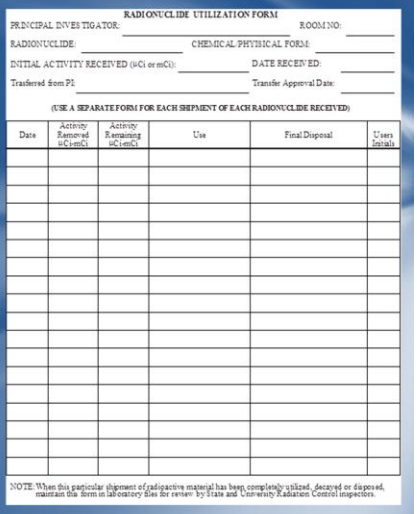
RADIATION READINGS:

Laboratory surveying and monitoring. This is an example of a Radiation Contamination Survey form. Documentation of routine surveys of the work area are required within 7 days of radioactive material use or once a month if radioactive materials or radioactive waste is stored in the lab.

UTILIZATION FORMS

Upon receipt of a radioactive package:

- A utilization form must be initiated immediately and dated for package procurement date
- An entry must be made on this form for each usage



RADIONUCLIDE UTILIZATION FORM

PRINCIPAL INVESTIGATOR: _____ ROOM NO: _____

RADIONUCLIDE: _____ CHEMICAL/PHYSICAL FORM: _____

INITIAL ACTIVITY RECEIVED (uCi or mCi): _____ DATE RECEIVED: _____

Trasferred from PI: _____ Transfer Approval Date: _____

(USE A SEPARATE FORM FOR EACH SHIPMENT OF EACH RADIONUCLIDE RECEIVED)

Date	Activity Removed uCi-mCi	Activity Remaining uCi-mCi	Use	Final Disposal	Users Initials

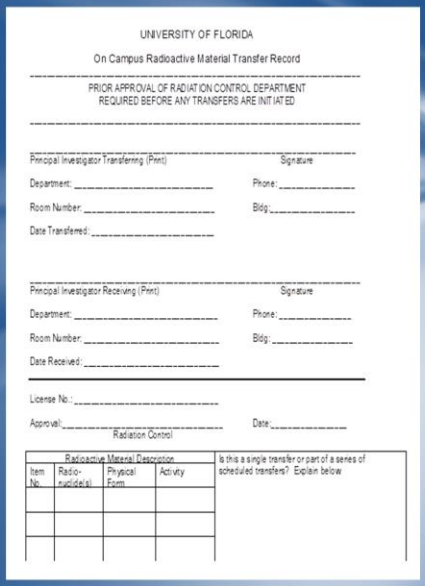
NOTE: When this particular shipment of radioactive material has been completely utilized, decayed or disposed, maintain this form in laboratory files for review by State and University Radiation Control inspectors.

Utilization Forms, these must be initiated immediately when radioactive material is received in the lab. Each time any of the material is used an entry must be made on the utilization form. This provides the PI with exactly how much material was used and how much remains for inventory.

TRANSFER FORMS

Material Transfer:

- On and off campus transfer of materials must be approved by Radiation Control Department
- Utilization form must accompany transfer form.



UNIVERSITY OF FLORIDA

On Campus Radioactive Material Transfer Record

PRIOR APPROVAL OF RADIATION CONTROL DEPARTMENT REQUIRED BEFORE ANY TRANSFERS ARE INITIATED

Principal Investigator Transferring (Print) Signature

Department: _____ Phone: _____

Room Number: _____ Bldg: _____

Date Transferred: _____

Principal Investigator Receiving (Print) Signature

Department: _____ Phone: _____

Room Number: _____ Bldg: _____

Date Received: _____

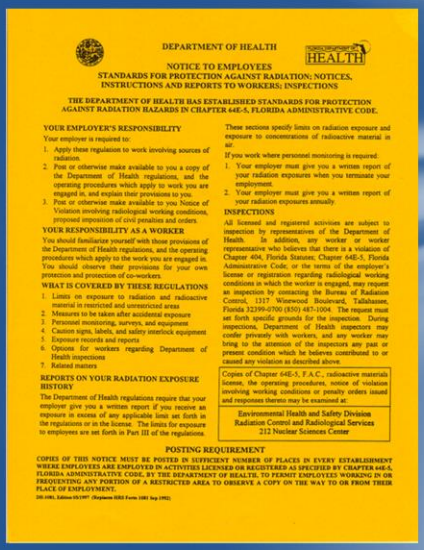
License No.: _____

Approval: _____ Date: _____
Radiation Control

Radioactive Material Description				Is this a single transfer or part of a series of scheduled transfers? Explain below
Item No.	Radio-nuclide(s)	Physical Form	Activity	

If a PI finds it necessary to transfer material to another PI the a material transfer form must be generated. On and off campus transfers must be approved by the radiation control department. Remember that a utilization form must accompany the transfer form.

DOH – NOTICE TO EMPLOYEES



DEPARTMENT OF HEALTH

HEALTH

NOTICE TO EMPLOYEES
STANDARDS FOR PROTECTION AGAINST RADIATION; NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS

THE DEPARTMENT OF HEALTH HAS ESTABLISHED STANDARDS FOR PROTECTION AGAINST RADIATION HAZARDS IN CHAPTER 64E-5, FLORIDA ADMINISTRATIVE CODE.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to:

1. Apply these regulation to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Department of Health regulations, and the operating procedures which apply to work you are engaged in, and explain their provisions to you.
3. Post or otherwise make available to you Notice of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

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 co-workers.

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 of Health inspections
7. Related matters

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

The Department of Health regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit set forth in the regulations or in the license. The limits for exposure to employees are set forth in Part III of the regulations.

These sections specify limits on radiation exposure and exposure to concentrations of radioactive material in air.

If you work where personnel monitoring is required:

1. Your employer must give you a written report of your radiation exposures when you terminate your employment.
2. Your employer must give you a written report of your radiation exposures annually.

INSPECTIONS

All licensed and registered activities are subject to inspection by representatives of the Department of Health. In addition, any worker or worker representative who believes that there is a violation of Chapter 404, Florida Statutes; Chapter 64E-5, Florida Administrative Code; or the terms of the employer's license or registration regarding radiological working conditions in which the worker is engaged, may request an inspection by contacting the Bureau of Radiation Control, 1317 Winewood Boulevard, Tallahassee, Florida 32399-0700 (850) 487-1004. The request must set forth specific grounds for the inspection. During inspections, Department of Health inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation as described above.

Copies of Chapter 64E-5, F.A.C., radioactive materials license, the operating procedures, notice of violation involving working conditions or penalty orders issued and responses thereto may be examined at:

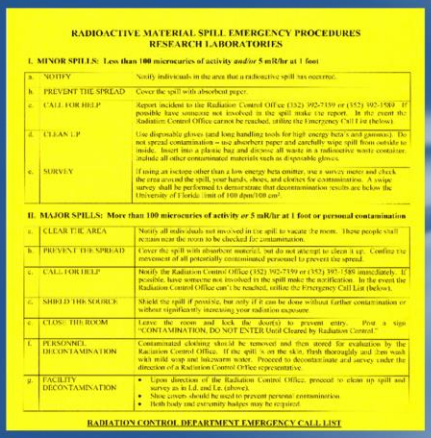
Environmental Health and Safety Division
Radiation Control and Radiological Services
212 Nuclear Sciences Center

POSTING REQUIREMENT

COPIES OF THIS NOTICE MUST BE POSTED IN SUFFICIENT NUMBER OF PLACES IN EVERY ESTABLISHMENT WHERE EMPLOYEES ARE EMPLOYED IN ACTIVITIES LICENSED OR REGISTERED AS SPECIFIED BY CHAPTER 64E-5, FLORIDA ADMINISTRATIVE CODE, BY THE DEPARTMENT OF HEALTH, TO PERMIT EMPLOYEES WORKING IN OR FREQUENTING ANY PORTION OF A RESTRICTED AREA TO OBSERVE A COPY ON THE WAY TO OR FROM THEIR PLACE OF EMPLOYMENT.

Required postings for each authorized lab include the Florida Department of Health Notice to Employees. If this is not posted please contact radiation control and one will be provided.

SPILL EMERGENCY PROCEDURES



RADIOACTIVE MATERIAL SPILL EMERGENCY PROCEDURES
RESEARCH LABORATORIES

I. MINOR SPILLS: Less than 100 microcuries of activity *and/or* 5 mR/hr at 1 foot

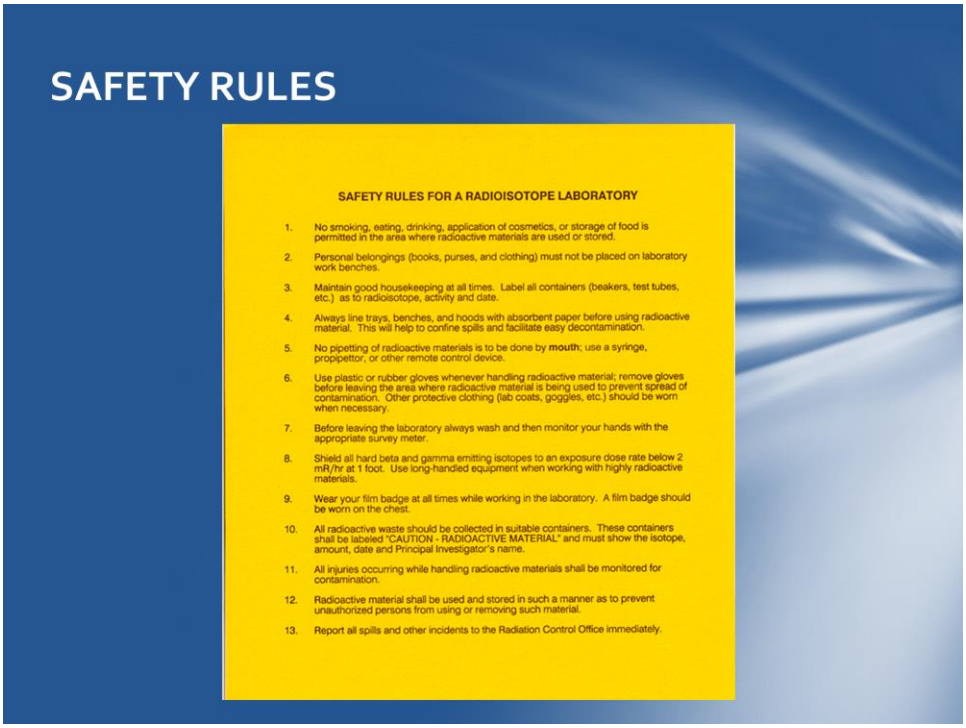
a.	NOTIFY	Notify individuals in the area that a radioactive spill has occurred.
b.	PREVENT THE SPREAD	Cover the spill with absorbent paper.
c.	CALL FOR HELP	Report incident to the Radiation Control Office (352) 392-7159 or (352) 392-1589. If possible, have someone not involved in the spill make the report. In the event the Radiation Control Office cannot be reached, utilize the Emergency Call List (below).
d.	CLEAN UP	Use disposable gloves (and long handling tools for high energy beta's and gammas). To not spread contamination – use absorbent paper and carefully wipe spill from outside to inside. Insert into a plastic bag and discard all waste in a radioactive waste container. Initials all other contaminated materials such as disposable gloves.
e.	SURVEY	If using an isotope other than a low energy beta emitter, use a survey meter and check the area around the spill, your hands, shoes, and clothes for contamination. A swipe survey shall be performed to demonstrate that decontamination results are below the University of Florida limit of 100 dpm/100 cm².

II. MAJOR SPILLS: More than 100 microcuries of activity *or* 5 mR/hr at 1 foot or personal contamination

a.	CLEAR THE AREA	Notify all individuals not involved in the spill to vacate the room. These people shall remain near the room to be checked for contamination.
b.	PREVENT THE SPREAD	Cover the spill with absorbent material, but do not attempt to clean it up. Confine the movement of all potentially contaminated personnel to prevent the spread.
c.	CALL FOR HELP	Notify the Radiation Control Office (352) 392-7159 or (352) 392-1589 immediately. If possible, have someone not involved in the spill make the notification. In the event the Radiation Control Office can't be reached, utilize the Emergency Call List (below).
d.	SHIELD THE SOURCE	Shield the spill if possible, but only if it can be done without further contamination or without significantly increasing your radiation exposure.
e.	CLOSE THE ROOM	Leave the room and lock the door(s) to prevent entry. Post a sign "CONTAMINATION, DO NOT ENTER Until Cleared by Radiation Control."
f.	PERSONNEL DECONTAMINATION	Contaminated clothing should be removed and then stored for evaluation by the Radiation Control Office. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water. Proceed to decontaminate and survey under the direction of a Radiation Control Office representative.
g.	FACILITY DECONTAMINATION	• Upon direction of the Radiation Control Office, proceed to clean up spill and survey as in f.d. and f.e. (above). • Shoe covers should be used to prevent personal contamination. • Both body and extremity badges may be required.

RADIATION CONTROL DEPARTMENT EMERGENCY CALL LIST

A second required posting is the Emergency Procedure for Spills. There is information in the event of a minor spill and a major spill. The most important thing on this posting is the Emergency Call List. Familiarize yourself with the call numbers listed on your sheet, as the individuals need to be contacted in the order in which they appear.



There should also be a list of Safety Rules for Radioisotope laboratories posted in each approved lab. There are 13 important safety rules to remember. Please take some time to read these. Always remember to work safer and smarter when working with radioactive material. Thank you!