

Radiation Safety at the University of Vermont

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Radiation Use at UVM

- ◆ 110 Authorized Principle Investigators
- ◆ 360 Certified Secondary Users
- ◆ 14 Buildings on and off campus locations
- ◆ 110 Certified Radiation Laboratories
- ◆ Broad Scope Medical Use License
- ◆ Non-Human Radiation Applications
- ◆ Sealed, Unsealed, and Machine Produced

Authority to Use Radiation

Federal Government;

- ◆ Nuclear Regulatory Commission – NRC
10 CFR 20 – main safety regulation

Within UVM;

- ◆ Radiation Safety Committee – RSC
- ◆ Radiation Safety Office – RSO
- ◆ Principle Investigator – PI
- ◆ Secondary Users

NRC Inspections

- ◆ Unannounced
- ◆ Once every 2-3 years
- ◆ Usually a two day inspection
- ◆ Can impose a monetary fine
- ◆ Will issue a notice of any violation found
- ◆ Could suspend or revoke UVM's license

Responsibility of the RSO

- ◆ Perform unannounced inspections of all radiation labs at least once per year
- ◆ Certify every radiation user
- ◆ Authorize, order and receive all radioactive packages
- ◆ Ship all radioactive packages
- ◆ Dispose of all radioactive waste
- ◆ Respond to radiation emergencies
- ◆ Provide radiation monitoring
- ◆ Maintain UVM's license to use radiation

Who Can Use Radiation at UVM?

- ◆ Only Certified Persons – those who have registered with the RSO and have passed an exam.
- ◆ Let the RSO know if you stop using radiation or you move to another lab.
- ◆ Certification is good for a 3 year period.

Responsibility of Principle Investigators

- ◆ Responsible for radiation safety in their lab(s).
- ◆ Correct violations that may occur.
- ◆ Provide funds for radioactive waste disposal.
- ◆ Train all persons using radiation under their authorization granted by the RSC.

Responsibility of Secondary Radiation Handlers

- ◆ Submit all radiation purchases to the RSO for approval
- ◆ Secure all radiation sources
- ◆ Perform weekly contamination surveys
- ◆ Wear radiation dosimeters as needed
- ◆ Follow all the rules in the RSO Handbook
- ◆ Sort all radioactive waste into proper categories

Good Lab Safety Practices

- ◆ Dry run
- ◆ Lab coat and disposable gloves
- ◆ Signs and labels
- ◆ Time, Distance, Shielding
- ◆ Personal monitoring
- ◆ Area monitoring

Radiation Dosimeters

Persons using high energy beta emitters (P-32) or any gamma emitters (I-125) must wear a whole body and ring badge to measure personal radiation dose.

Persons using low energy beta emitters (H-3, C-14, S-35) do not need to wear radiation dosimeters.

Proper Use of Whole Body Radiation Dosimeters

1. Worn on upper part of body facing forward.
2. Used to measure only occupational exposures.
3. Left at work in a radiation free area.
4. Exchanged each month.
5. Only for that specifically identified person.

Not Permitted in a Radiation Handling Lab

- ◆ Smoking, eating, or drinking
- ◆ Applying cosmetics
- ◆ Storage of food in refrigerators or freezers
- ◆ Baby-sitting or Child-care in the lab

Risk of Radiation Contamination

- ◆ Internal Radiation Exposure
 - Absorption, ingestion, injection, inhalation
- ◆ External Radiation Exposure
 - High energy beta or gamma emitters
- ◆ Interference with Experiments

Lab Contamination Surveys

- ◆ Radiation Handling lab – **52** surveys/yr
(If no use in a week, report must still be sent to the RSO indicating that fact.)
- ◆ Radiation Storage lab – **12** surveys/yr
- ◆ Any area greater than **3 times** the background = significant contamination and must be decontaminated.

Contamination Surveys

Wipe Test

- ◆ Using a Q-tip or filter paper, areas are swiped to check for removable radiation and then put in a liquid scintillation or gamma counter.
- ◆ All beta emitters and some gamma emitters

Geiger Survey

- ◆ Use of a Geiger survey meter to scan the areas where radiation was used.
- ◆ Only can detect high energy beta emitters (P-32) or gamma emitters.

Use of a Portable Survey Meters

◆ All Geiger type survey meters must;

1. Have it's battery checked
2. Have the background level checked
3. Perform a radiation measurement with a radiation check source
4. Be calibrated each year

Log and Inventory Sheet

- ◆ All radioactive material vials will have a “Log and Inventory Sheet” accompanying it.
- ◆ Record the radiation use as it’s being used.
- ◆ Return to the RSO when the vial is no longer of any research value and is disposed.

Radiation Emergency

- ◆ Spill – contain and secure area
- ◆ Call the RSO during working hours
8:00am to 4:30pm at x62570
- ◆ Call 911 if it is a medical emergency
- ◆ Call Police Services – x63473 to contact
the RSO during holidays or nights and
weekends for all other emergencies.

Pregnancy and Radiation Use

- ◆ Pregnant radiation users have a right-to-work and a right-to-safety.
- ◆ They must declare her pregnancy to the RSO in writing.
- ◆ Meet with the Director the the RSO
- ◆ A fetal radiation badge may be issued.
- ◆ All female radiation users are given a copy of the NRC Regulatory Guide 8.13.

Radioactive Waste Disposal

- ◆ No radioactive materials can be disposed in the sanitary sewer or incinerated.
- ◆ Even slightly contaminated items must be disposed as RAW.
- ◆ Solid RAW must be stored in yellow 5, 20 or 30 gallon containers provided by the RSO or in plexiglass boxes bought by each lab.
- ◆ RAW must be sorted according to half-life and form.
- ◆ RAW is billed by volume and category.

Other RAW Facts.....

- ◆ RAW stored in lab to decay must be stored 10 half-lives
- ◆ All decayed (non-radioactive) must be disposed by the RSO.
- ◆ UVM can store radioisotopes with a half-life less than 90 days.
- ◆ Call the RSO to have your waste picked up. Appointments are only on Fridays.

NRC and UVM Dose Limits

NRC Yearly Limit

- ◆ Whole Body – 5000 mrem
- ◆ Skin – 50,000 mrem
- ◆ Extremities – 50,000 mrem
- ◆ Lens of Eye – 15,000 mrem
- ◆ Fetus – 500 mrem per 9 months

UVM Yearly Limit

- ◆ Whole Body – 500 mrem
- ◆ Skin – 5,000 mrem
- ◆ Extremities – 5,000 mrem
- ◆ Lens of Eye – 1,500 mrem
- ◆ Fetus – 50 mrem per 9 months

ALARA

- ◆ Radiation safety philosophy and policy to keep radiation exposure....

As Low As Reasonably Achievable

- ◆ UVM investigates any radiation doses greater than 10% of the monthly limit.

Contacting the RSO

◆ Located: 004 Rowell Building

Office hours: M-F 8:00 -12:00, 1:00-4:30

◆ Phone: 656-2570

◆ FAX: 656-8876

◆ Email: radsafe@uvm.edu

◆ Website: <http://www.uvm.edu/~radsafe>