



# Radioactive Material User Annual Refresher Training



Created by SU Environmental Health  
& Safety Services

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# Radioactive Material User Annual Refresher Training



Welcome to Syracuse University's On-Line Radioactive Material User Refresher Training. This Refresher Training is comprised of a review of pertinent topics from the University's Radiation Safety Program. Completing this training will fulfill your annual NYS Department of Health radiation refresher training requirement.

To begin this on-line training, please read the agreement below:

**Agreement:** *I agree to read the information contained in this refresher training and in doing so, understand that I have fulfilled my annual radiation training requirement. Upon completion of the training, I will fill out the "on-line" registration form and if I have any questions or need additional information, I will contact Environmental Health and Safety Services at 315.443.4132.*

*I understand that credit for completion of this on-line training will only be granted upon completion and submittal of the registration form at the end of the training.*

If you do not accept this agreement, please contact Environmental Health and Safety Services at 315.443.4132 for alternative methods of completing your annual refresher training requirement.

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# Authorized Radiation Use and Training

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## Authorized Radiation Use

All use of ionizing radiation at Syracuse University must be approved by the University's Radiation Safety Committee.

Any planned changes to approved radiation use authorizations must also be approved by the Radiation Safety Committee including:

- Use of a new isotope
- New use location
- New or modified use procedures
- Increase in maximum possession limit of an approved isotope



All radiation workers must work under the direction of a Radiation Supervisor authorized by the University's Radiation Safety Committee.

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## Training Requirements for Radiation Workers

NYS Department of Health regulations require that all individuals who work with or receive occupational exposures to ionizing radiation must be instructed of hazards and related rules and regulations initially and annually thereafter.

- Initial Radiation Safety Training: This is a two phase program which includes:
  - ✓ Phase I: a lecture, safety videos and an examination.
  - ✓ Phase II: a lab orientation and documented on-the-job training specific to the radiation work to be performed.
- Annual Refresher: All SU Authorized Radiation Workers must complete an annual radiation refresher to maintain their radiation worker status. This is the training you are completing today.
- Laboratory Change: If an Authorized Radiation Worker moves to a different laboratory, they must complete a new lab orientation and on-the-job training specific to the procedures or isotopes to be used in the new laboratory. This training must be documented and submitted to EHSS.

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## Training Requirements for “Non-Radiation Use” Lab Workers

- Lab employees who will not handle radiation sources but may work in the vicinity of a controlled radiation area must be informed of the radiation hazard present prior to working in the area. The extent of the training will be determined by the Radiation Safety Officer.
- If the individual is to perform duties which may present an occupational radiation exposure (i.e. laboratory radiation surveys) or present a potential for radioactive contamination, the individual must minimally complete Phase I of the Radiation Worker Training Program.
- The individual’s radiation supervisor must also complete a Radiation Hazard Assessment form and submit it to the RSO for determination of any additional on-the-job training that will be necessary.



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# Radiation Survey Requirements

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## Radioactive Material Use Area Surveys

- NYS Department of Health requires contamination and exposure surveys to be performed in all radiation use areas at established frequencies.
- The required surveys must be performed if radiation sources, samples, or waste are present in the laboratory, even if no active radiation use occurred.
- NYS Department of Health requires that actions be taken to eliminate contamination in excess of established contamination limits .
- Survey records must be maintained for 3 years and must be made available to NYS Department of Health upon request.





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## Radiation Area Surveys

- Area Survey: Must be performed with an appropriate meter after each use of radioactive material and before leaving the controlled area.
- Ambient Exposure Survey: Must be performed and documented monthly in most radiation use laboratories. The survey must be performed with an appropriate meter at locations in the lab where exposures are likely to occur with results recorded in mR/hr.



## Radiation Removable Contamination Survey

- Wipe Test Survey: Must be performed monthly in all radioactive material labs. Wipe test samples must be submitted to EHSS for analysis at the end of each month.



***Any identified contamination must be promptly remediated.***

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## Radiation Personal Contamination Surveys

Radiation Workers should continuously monitor their hands (gloves) and lab coat with an appropriate meter when using radioactive materials and prior to leaving the radiation use area.

### If Personal (skin) contamination is detected:

- Remove contaminated clothing
- Monitor (and record) the level of contamination
- Immediately wash contaminated area with mild soap and lukewarm water
- Do not use solvents or anything which will cause skin abrasions
- Notify the Radiation Safety Officer (315.443.4132) or the Department of Public Safety (315.443.2224)



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## Radiation Surface Contamination Limits

The following are the levels at which beta and gamma radioactive contamination must be remediated in accordance with NYS Department of Health Regulations. At SU the Radiation Safety Office will typically recommend that contamination be remediated at lower levels, distinguishable from background radiation.

|                           | <b>Total Contamination</b> | <b>Removable Contamination</b> |
|---------------------------|----------------------------|--------------------------------|
| Radiation Work Area       | 0.5 mR/hr                  | 1000 dpm                       |
| Person or Personal Object | Non-detectable             | Non-detectable                 |
| Release of Facility       | 0.1 mR/hr                  | 500 dpm                        |

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# Radiation Exposure Monitoring and Minimization

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## Personal Radiation Exposure Monitoring

Individuals will be monitored for occupational radiation exposure at Syracuse University if:



- ✓ they have a potential to receive more than 10% of the occupational dose limits
- ✓ They are a voluntarily "declared" pregnant woman
- ✓ deemed appropriate by the RSO

|                      | <b>Annual Occupational Dose Limit</b> |
|----------------------|---------------------------------------|
| Whole Body           | 5 Rem                                 |
| Skin and Extremities | 50 Rem                                |
| Eyes                 | 15 Rem                                |

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## Personal Radiation Exposure Monitoring

**Declared Pregnant Woman** = a woman who has voluntarily informed the Radiation Safety Officer of her pregnancy

A woman is not required to give medical proof of pregnancy and may withdraw her declaration at any time

### Occupational Dose Limits for Embryo/Fetus of a Declared Pregnant Woman

- 500 mrem for entire pregnancy
- Working conditions should be adjusted to avoid monthly exposure  $>50$  mrem

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## External Exposure Monitoring Rules

- Dosimeters must be worn by individuals assigned them at all times when using or in close proximity to ionizing radiation.
- Dosimeters must be stored in a centralized location, free of possible irradiation, heat, humidity or direct sunlight.
- Deliberate or unnecessary irradiation of a personal dosimeter is strictly prohibited.
- Lost or damaged dosimeters must be reported to the RSO immediately.
- Occupational exposure monitors must never be worn for non-occupational exposures (i.e. medical x-rays).

If an individual will be simultaneously monitored for occupational exposure at Syracuse University and another institution, the individual must notify SU EHSS so that the individual's occupational exposure monitoring records can be shared between SU and the other institution.

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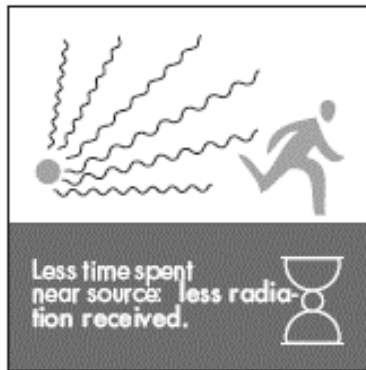
**SU is committed to keeping radiation exposures **ALARA****

*As Low As Reasonably Achievable*

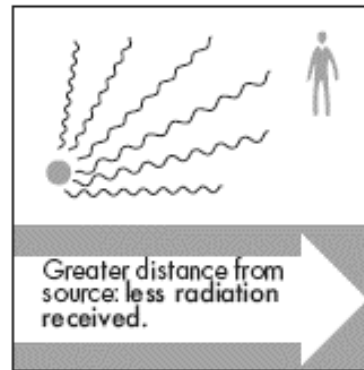
## Time

## Distance

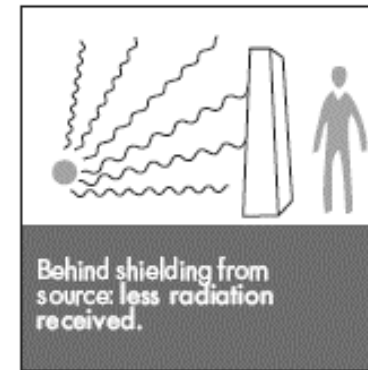
## Shielding



Minimize time  
spent near  
radiation sources



Maintain maximum  
distance from  
radiation sources



Use shielding  
Lead for gamma  
Plexiglass for beta

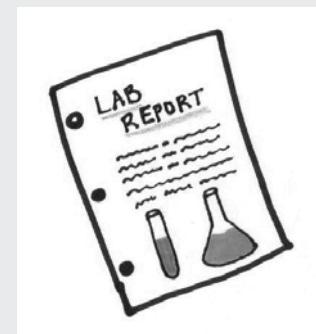


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## Work Practices to Minimize Radiation Exposure:

- No eating, drinking, smoking or application of cosmetics in labs.
- Always wear lab coats, gloves and safety glasses.
- Use absorbent paper & trays for radioisotope work & storage areas.
- Employ time, distance and shielding to minimize radiation exposures.
- Continuously monitor hands (gloves) and lab coat with an appropriate meter when using radioactive materials.
- Maintain good housekeeping practices to ensure a clean work area.
- Always secure radioactive materials from unauthorized access.
- Know proper spill clean-up procedures.
- Contact EHSS with any questions or concerns.



*SU is committed to keeping all radiation exposures ALARA*

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# Radioactive Material Use Best Work Practices

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## Best Work Practices

**Double Gloves:** The use of a double-glove technique is an effective method for reducing potential skin contamination in the event that the outer glove is torn or punctured.



**Ring dosimeters:** Individuals who have been issued a ring dosimeter must wear the ring dosimeter under a disposable glove to prevent the possibility of contaminating the ring, resulting in false exposure readings.



**Personal Protective Equipment:** Wear proper protective equipment and clothing including safety glasses, lab coat and disposable gloves. Shorts and open-toed shoes must be avoided.



**Radioactive Material Purchases:** All purchases of radioactive materials must be approved and coordinated by the Radiation Safety Officer.

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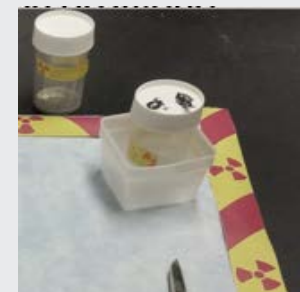
## Best Work Practices - Spill Prevention

**Secondary Containment:** Secondary containment must be provided for all radioactive liquids including waste containers, micro tubes, source vials, stock vials, etc. The secondary container must be capable of containing the contents of the largest container stored in it.



**Transport of Radioactive Materials:** Radioactive materials transported through a non-controlled area must be provided with tertiary containment (i.e. primary container in plastic sealed tub placed on a lab cart) and be approved by the RSO prior to the initial transport.

**Absorbent paper:** Plastic backed absorbent paper and spill trays are very useful for containing spills. The use of these greatly reduces the spread of contamination.





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## Best Work Practices - Labeling

**Storage and Use Area:** All use and storage areas must be approved by the Radiation Safety Officer, labeled to indicate the radiation hazard, and secured at all times.



**Equipment Labeling:** All equipment used in conjunction with radioactive materials must be dedicated for radiation use and labeled to indicate the potential radiation hazard.

**Source Labeling:** All radioactive materials (i.e. samples, sources, stock solutions) must be labeled to indicate the radiation hazard and with the isotope, activity and date.

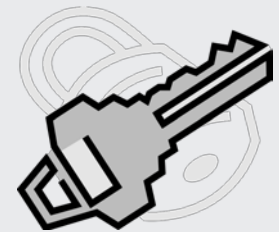
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## Best Work Practices - Security Requirements

The security of radioactive materials is an extremely important issue at Syracuse University. All users of radiation sources are required to take active measures to prevent access to radiation sources by unauthorized persons.

- Only trained and authorized radiation workers may access/work in a controlled area.
- Laboratory doors must be locked when trained and “authorized” radiation workers are not present in the radiation laboratory.
- Radiation sources must be secured in a locked storage container (box, cabinet, refrigerator) within the controlled area.
- Lab members must inquire about the identity of any unknown persons who may enter the laboratory or loiter nearby. A person with a legitimate reason for being there will not object to such a request.
- Report missing or lost radiation sources to the RSO immediately.



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## Decommissioning and Vacating Controlled Area

Once an area has been designated as a controlled radiation area, it shall remain so until it has been found suitable for non-radioactive uses and released by Radiation Safety staff.

The Radiation Safety Officer will direct the “close-out” procedure performed by the vacating Radioactive Material Supervisor. Radiation Safety staff will also verify all results of the close-out.

It is the obligation of the Radioactive Materials Supervisor to notify the RSO, in writing, 60 days in advance of the intended date to vacate an established radiation use area and properly decommission (close-out) the area.



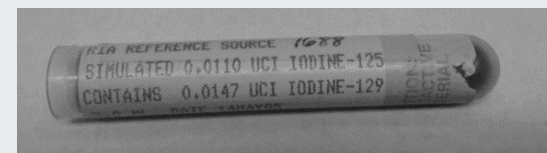
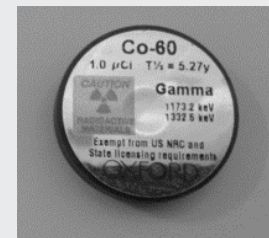
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## Best Work Practices - Sealed Source Use

A sealed source is a source of radioactive material that is permanently bonded or fixed in a capsule or matrix. The capsule or matrix must be designed to prevent the release and dispersion of the radioactive material during conditions which are likely to be encountered in normal use and handling.

- Sealed sources must be properly labeled, shielded and secured from unauthorized access at all times.
- Each time a sealed source is removed from a storage area by authorized personnel, the date, time of removal and the user's name must be entered into the sealed source log book. The return of the source must also be noted in the log book.
- The loss, damage or misuse of a sealed source must be reported to the RSO immediately.



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# Radioactive Waste Management

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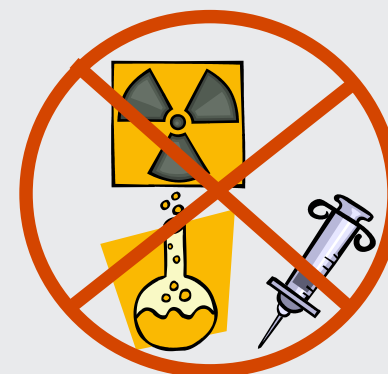
## Radioactive Waste Management Requirements

### Radioactive waste containers must be:

- Properly labeled (isotope, activity and date).
- Stored in the controlled area.
- Segregated by isotope and form (liquid, solid, etc.).
- Secured from unauthorized access.
- Wipe tested prior to pick up and free of external contamination.

### Radioactive Waste Containers may not Contain:

- Sharps (syringes, needles, razor blades, etc.)
- Hazardous chemicals (without prior RSO approval)
- Radiation markings or symbols
- Biohazards



*No radioactive waste may be disposed to the sanitary sewer unless special approval is received from the Radiation Safety Officer.*

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## Radioactive Waste Management Requirements

### Dry Solid Waste:

- Paper, plastic and glass only
- Only small volume incidental liquids
- No lead, sharps or infectious materials



### Aqueous Liquid Wastes

- Radioactive aqueous liquids only
- No hazardous chemicals or infectious waste
- Maximum 1 gallon, non glass containers only



### Sharps Waste

- Accumulate in puncture proof container
- No infectious material



**All other radioactive wastes require special approval from the Radiation Safety Officer PRIOR to generation.**

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# Radioactive Material Incident Response

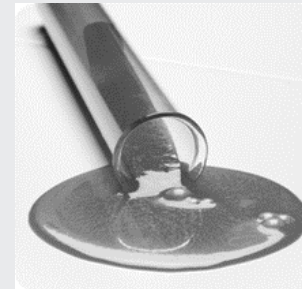
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## Radioactive Material Spill Procedure

In the event of a spill or release of radioactive materials:



1. **Stop Work** and, if possible, prevent further release/spread of the material.
2. **Evacuate:** Immediately notify all individuals in the area and evacuate the area.
3. **Notify:** Call SU DPS at 315.443.2224 or the Radiation Safety Officer.
4. **Stay:** Stay in safe location to meet emergency responders.
5. **Decontaminate:** Individuals who may have been contaminated by radioactive materials should remove contaminated clothing and begin to wash contaminated area with lukewarm water.
6. **Do Not Re-Enter the Affected Area**

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## Contaminated Persons

In the event of a person should become contaminated by radioactive materials:

1. Remove all contaminated clothing (they should do this themselves while wearing clean gloves).
2. Monitor and record the level of contamination using an appropriate survey meter.
3. Gently wash contaminated area with lukewarm water and a mild soap.
4. Immediately notify SU DPS (315.443.2224) and/or the Radiation Safety Officer (315.443.4132).



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*Thank you for completing your annual radioactive material worker refresher training.*

Please click the button below to complete the Training Registration Form to receive credit for completing this training.

**Click Here to Complete  
Training Registration Form**

*If you do not submit the registration form you will not receive credit for completion of this training.*

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*If you have questions please contact the Radiation Safety Officer at 315.443.4132*