

**UNIVERSITY OF MINNESOTA**

**Radiation Safety  
Annual Refresher Training**



**Radiation Protection Division**

**Department of Environmental Health & Safety**

# Topics in Radiation Safety (applicable RPD Manual sections indicated)

## User and Non-user topics

- ❑ **Types of Radioactivity in CDD labs**
- ❑ General requirements (posting, training, security)
- ❑ Food and beverage prohibition
- ❑ Proper laboratory attire (Lab Safety Plan)
- ❑ Contamination surveys and instrumentation (Sec. V)
- ❑ Radioisotope spills and emergencies (Sec. XII)
- ❑ ALARA considerations
- ❑ Other \_\_\_\_\_

# Types of Radioactivity in CDD Labs

## *Aldrich Lab (PWB 7-169)*

- 3-H
- 32-P

*Aldrich lab is an active radioactive research lab*

## *Vince Lab (WDH 9-131)*

- 14-C
- 3-H
- 35-S
- 125-I

*Vince lab is an active radioactive research lab*

# Low Energy Beta Emitters

- Low Energy Beta Emitters (H-3, C-14, S-35)
- Most research involving H-3 and C-14 low energy beta emitters may be performed on a laboratory bench in spill tray
- Research involving S-35 must be performed in fume hood
  - low temperature storage of  $^{35}\text{S}$  compounds may cause pressure to develop in the vial during the thawing process
- Additional shielding (lucite or lead) is not required
- Cannot detect low energy beta emitters using Geiger counter
- Use liquid scintillation detector to monitor for contamination

# High Energy Beta Emitters

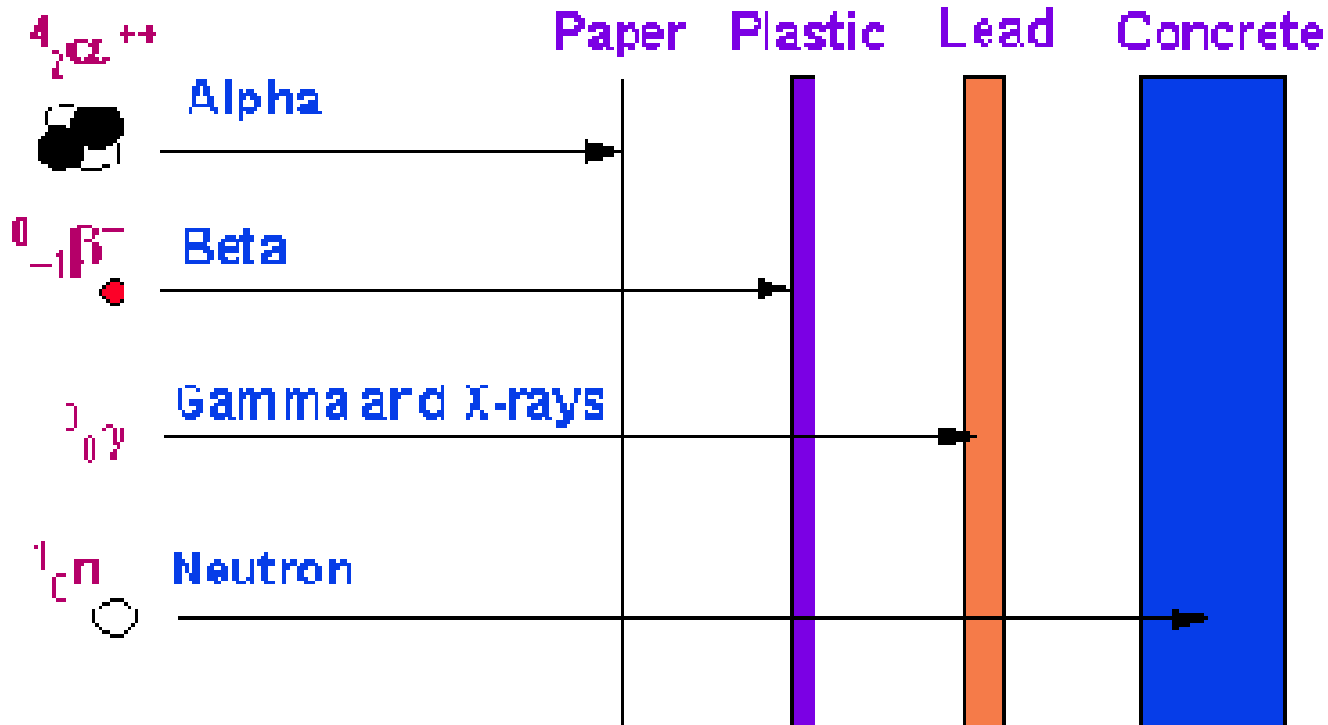
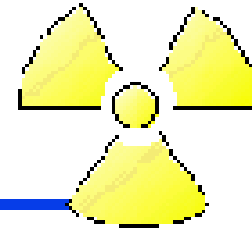
- High Energy Beta Emitters (P-32)
- Wear whole body and ring badge when using material (greater than 1mCi)
- Use 1 cm thick lucite shielding when handling material
- For larger quantities of material add 3 to 6 mm of lead to the outside surface of the lucite shield
  - Always shield the Beta particles first!
- Do not look into or work over and open container of P-32 without shielding
- Routinely monitor gloves with Geiger counter for contamination and replace if highly contaminated
- Isolate waste in a labeled, shielded container
- Use liquid scintillation detector to monitor lab for contamination

# Gamma Emitters

- Gamma Emitters (I-125) - Store material in shielded containers (lead pigs)
- Whole body badges are required for work with large quantities (mCi)
- Minimize exposure with lead shielding (typically use lead foil for low energy emitters such as I-125)
- Most research involving gamma emitters may be performed on a laboratory bench in spill tray with the exception of I-125 radiolabeling which must be done in a special room over in Boynton
- Isolate waste in a labeled container
- Use Geiger counter or liquid scintillation counter to detect gamma emitters

# Types of Radioactive Shielding

## Penetrating Distances



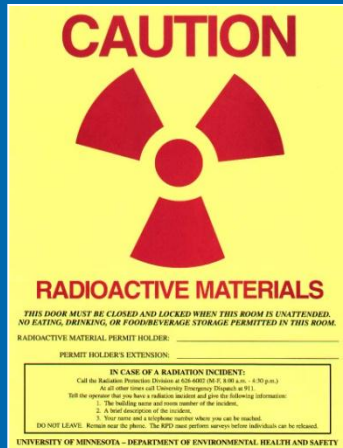
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- Other \_\_\_\_\_



# General Requirements



- Posted labs are restricted areas.
- Training of staff is required.
  - Visitors must be escorted at all times.
- Material must be secured from unauthorized removal or access while in storage.
- Material must be kept under constant surveillance when not in storage.



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**(Sec. V)**
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# Contamination Surveys



- Lab staff are required to monitor and survey their own work stations, storage locations, etc., at specified frequencies.



- The Radiation Protection Division periodically surveys all radioisotope laboratories.



- Laboratory equipment must be free of contamination before being removed from the lab for disposal or repair.

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# Spills and Emergencies

What should you do?

- Remain calm.
- Let everyone know that you may have an incident.
- Contact the Radiation Protection Division (RPD).
- Everyone must remain in the area until RPD arrives to survey them.

# Spills and Emergencies

## How to contact the RPD

Monday – Friday, 8:00AM – 4:30PM:

**612-626-6002**

After hours, weekends and holidays:

**911**

*Please tell the emergency responder to contact the DEHS  
Radiation Protection worker on call*

**Remain in the area and wait for help to arrive.**



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# ALARA

- **As Low As Reasonably Achievable.**
- Exposure control, both internal & external
  - Internal
    - Food and beverage prohibition
    - Inhalation protection
  - External
    - Time, distance & shielding
    - Safe handling procedures

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# Underage Workers

- If you have anyone working in your lab under the age of 18 years old (graduate students, student workers, volunteers) they **MUST** wear a badge until they reach the age of 18
- Workers must also have consent forms signed by the legal guardian to work in a lab where hazardous materials are present or where hazardous activities may take place
- Workers must be trained, can only work in the lab during normal business hours and must be supervised at all times, **NO EXCEPTIONS**

# Orphaned Materials Incident

Situation: Materials were brought in by the widow of a PI who was clearing their house for sale.

Response: RPD conducts surveys of the house and biological monitoring of the widow. No contamination found. RPD also accepts several vials for waste disposal through proper streams.

Take Away: The RPD is happy to accept orphaned vials for proper disposal. These vials dated back to pre-1981 (some dated 1973). The PI had been retired from the U for a number of years.

We want to dispose of materials properly before it comes to this.

# Materials Recovered





# Materials Recovered Cont'd



Questions? Comments?

Don't hesitate to call

6-60002



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