Radiation Safety Training for CHOP Facilities/Resources and Environmental Services

Environmental Health and Radiation Safety (EHRS)
University of Pennsylvania
EHRS ensures that radiation is used safely at Penn and associated facilities such as HUP and CHOP.

You can learn more about EHRS by visiting our website at www.ehrs.upenn.edu
The University of Pennsylvania (including HUP and CHOP) has a license with the US Nuclear Regulatory Commission (NRC) and the PA Department of Environmental Protection (DEP) to use radioactive material.

Both licenses, along with regulations establish the procedures pertaining to radiation safety that must be followed.

Regulations and licenses can be reviewed online or at EHRS.
What is radiation?

Radiation is a type of energy. Ionizing radiation is a valuable aid in the practice of medicine. Radiation is used for research, diagnostic, and therapeutic purposes throughout CHOP.

The two basic sources of ionizing radiation are x-rays and radioactive materials.
Radiation Exposure

Everyone is exposed to radiation everyday.

Most of this radiation exposure comes from natural sources.

This chart lists sources and average exposures from both natural and man-made sources of radiation.
Radiation Exposure (cont’d)

<table>
<thead>
<tr>
<th>Yearly Radiation Dose Levels</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Regulatory Dose Limit for Radiation Workers</td>
<td>5,000 mrem</td>
</tr>
<tr>
<td>Natural Background Radiation Level</td>
<td>300 mrem</td>
</tr>
<tr>
<td>Typical Facilities/Resources or Environmental Services Staff Member’s Dose from Radiation Exposure at work</td>
<td>Less than 1 mrem</td>
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</tbody>
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The table above compares the estimated radiation dose received by Facilities/Resources and Environmental Services staff to other radiation levels.
Where is radiation used at CHOP?

Areas where radiation is used will be posted with warning signs similar to these.

Warning labels are also often posted on equipment, containers, or waste containers in radiation areas.
What should I do before entering a posted area?

1) Before entering any posted area, contact the supervisor of that area for instructions and restrictions.
2) Read posted instructions.
3) You may also contact EHRS if you have concerns about entering a posted area.
Precautions for Posted Areas

1) Do not handle, remove, or dispose of any containers, equipment, or instruments labeled with “CAUTION RADIOACTIVE” -- unless you are authorized to do so.

2) Do not remove radioactive waste.

3) Do not eat, drink, or smoke in areas where radioactive materials are used or stored.
Radiation Use at CHOP

**X-Rays** (radiology, cardiology, emergency)

- X-rays are produced by different kinds of X-ray machines.
- X-ray machines are not radioactive. Radiation is emitted only when the button is pushed and it stays in the room for less than one second.
- Neither the patient nor anything in the room becomes radioactive. Patients DO NOT emit radiation after an X-ray.

**Nuclear Medicine**

- Nuclear Medicine uses radioactive materials, which emit ionizing radiation.
- The radioactive material is injected into patients. Patients leave the department after they are scanned by a large camera.
- Patients contain radioactive materials afterwards and they DO emit a small amount of radiation.
Radiation Therapy at CHOP

Radiation Therapy treatments using radioactive material are performed in rooms 1 and 2 on the 3rd floor of the South Tower.

If a therapy procedure is in-progress, the sign shown here will be posted on the door.

You should not go into these rooms during a procedure unless you have contacted EHRS.
Blood Bank

The Blood Bank uses blood irradiators to treat blood before it is given to patients.

Blood irradiators have radioactive sources inside them. However, the radioactive sources can not be removed and are heavily shielded to minimize radiation levels.
If a lab uses radiation, there will be a “CAUTION RADIATION” label posted on or near the entrance.

Do not handle any items labeled as radioactive or attempt to move containers labeled as containing radioactive material.

Do not empty radioactive waste containers.
Potential Radiation Areas in Labs

**Fume Hoods**

If work requires being inside ductwork for a fume hood labeled for radiation use, the area must be surveyed by EHRS before work begins.

If work is outside of the duct, a survey is not required.

Hoods may have radiation labels on the hood face in the lab, on the exhaust duct on the roof – or both locations.

**Sinks**

Sinks are sometimes used to dispose of liquid radioactive material. They are flushed with water after each disposal.

If a sink is used for radiation disposal, it will be posted with a radiation label.

Do not clean radiation-labeled sinks. If you need to do work on a radiation-labeled sink or sink trap, they must be surveyed by EHRS before work begins.
Some pieces of lab equipment contain internal radioactive sources. All such equipment will have a radiation warning label on it.

The internal radiation sources are not a safety concern; however, they must be disposed of properly. Please contact EHRS if you see such equipment being disposed.

Never attempt to repair equipment with a radiation symbol on it unless it has been surveyed by EHRS and declared free of radioactive contamination.
Radioactive Packages

Labels on empty boxes should be removed or defaced before being put into normal trash by radiation workers.

If you find a labeled box, notify the supervisor of the area or EHRS.
Loading Dock Radiation Monitor

The Monitor checks waste for radioactive material.

The alarm response procedure is posted near the monitor.

If it alarms, locate the bag/box and take it to room SB10.
Loading Dock Radiation Monitor

Room SB10 is down the hall in Stemmler

Contact your supervisor for the lock combination

When you move waste to SB10, call to notify EHRS
Spills should be handled by EHRS, the Site Radiation Officer or trained radiation workers.

In the event of a spill:

1) Notify people in the immediate area that a spill has occurred.

2) Prevent the spread, if possible, by covering the spill with absorbent material.

3) In the event of personnel contamination promptly wash the contaminated area with soap and tepid water, being careful not to abrade the skin. Dry skin after washing.

4) Contact EHRS at 215-898-7187 during 8:00 am – 5:00 pm, Monday –Friday. During the evenings or on weekend, contact the on-call pager at 215-980-0035.
Emergencies (cont’d)

Notify EHRS immediately if:

1) You suspect deliberate misuse of radioactivity

2) You suspect personnel contamination, inhalation, injection or ingestion of radioactive material

3) Radioactive material is lost or stolen

4) Radioactive material, or an item labeled with “Caution Radioactive Material” is found in an unsecure location such as outside of a labeled room (hallway).

5) If you have any questions or concerns about radiation or radioactive materials