

RADIATION AREAS AT MSU

Ionizing radiation sources are used in many places throughout MSU. They are restricted to well defined and labeled areas, and are only to be handled by trained personnel. If you have additional questions about the areas listed below, contact EHS.

The most common types of radiation areas on campus are research laboratories, and medical treatment areas for humans, and medical treatment areas for animals. Non-radiation workers may enter some of these areas without special training. The potential for a measurable radiation dose in many of these areas is low, however that is not always the case. Within these areas radiation can be found in:

Storage areas: Concentrated solid and liquid material typically stored in small volumes

Waste areas: Diluted solid and liquid material typically stored in larger volumes

Work areas: Variable amounts and volumes; this is where radioactive material is handled

X-ray machines: Used in research and medical procedures for humans and animals. They can be found in research buildings and medical facilities throughout MSU.

SECURITY

Security is the **Top Focus** of all regulators. Federal law requires that regulated material must be under the licensee's constant control and surveillance; or otherwise be locked and secured to prevent tampering or removal. This means that radioactive materials in storage or unattended must be kept in locked containers or in areas that are not readily accessible to unauthorized individuals. All areas labeled as a Radiation Area **must be locked** when not in use. MSU community members should seek an authorized individual or EHS for assistance with radiation restricted areas.

WHEN TO CONTACT EHS

Incidents involving radioactive material must be reported to EHS. Contact your supervisor or EHS immediately if any of the following occur:

- Radioactive material has been, might have been released, or has been lost
- Radioactive labeled material is found in normal trash or in public areas
- If you have contaminated yourself with radioactive material
- If there is any emergency involving radiation

POINTS TO REMEMBER

- Stay away from situations where radiation work is in progress, material has been spilled, or warning signs or barriers are in place.
- Emergencies involving personal injury take priority over radiation concerns. Human life saving efforts always take priority.
- Don't hesitate to contact EHS with questions, all calls are welcome.

INCIDENT RESPONSE NUMBERS

During Work Hours:

Call EHS: 517-355-0153

After Work Hours:

Call MSU Police: 911

DO NOT LEAVE A MESSAGE!

Office of Environmental Health & Safety

Phone: **517-355-0153**

FAX: 517-353-4871

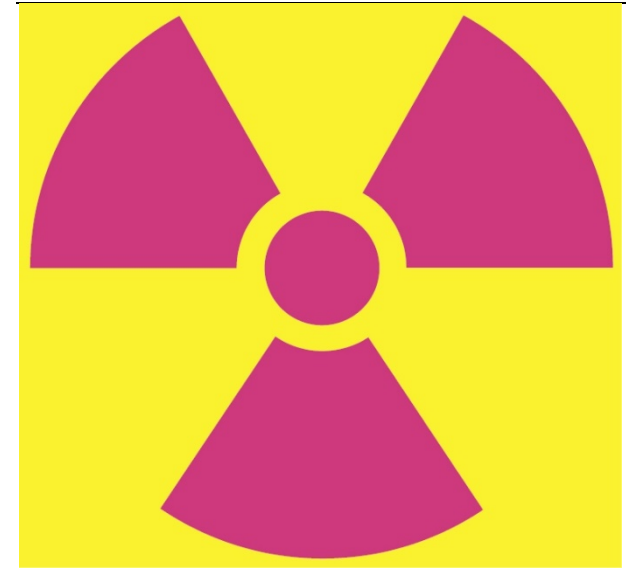
Email: ehs@msu.edu

Add.: 4000 Collins Rd., Lansing, MI 48910



Environmental Health & Safety
MICHIGAN STATE UNIVERSITY

RADIATION SAFETY: FOR NON-RADIATION WORKERS



Radioactive materials and instruments are important tools used in research and medicine. As a person supporting operations at Michigan State University, you may need to go into or near areas that have radiation. This document has been created to help you identify symbols, understand risks, and know basic safety for ionizing radiation at Michigan State University. Additional information on these topics can be found on the Environmental Health & Safety website at www.ehs.msu.edu.

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ENVIRONMENTAL HEALTH & SAFETY (EHS)

EHS is responsible for radiation safety at MSU. EHS maintains MSU's license with the US Nuclear Regulatory Commission (NRC) to use radiation. Any problems, concerns or questions you have on radiation safety issues should be directed to EHS at **517-353-0153**.

BASIC RADIATION INFORMATION

Radiation exists in many forms. Radiowaves, microwaves, infrared light, visible light, and ultraviolet are all types of radiation. Ionizing radiation is a special type of radiation that is strong enough to remove electrons from atoms. Ionizing radiation can be produced by x-ray machines, emitted from atoms during radioactive decay, produced during nuclear fission, or produced during nuclear fusion.



Sources of ionizing radiation are identified by using the universal radiation warning symbol called a trefoil. Official radiation symbols are colored magenta and yellow, or black and yellow.

Ionizing Radiation...

- can be in the form of particles or pure energy
- can have enough energy to penetrate through the human body or have so little energy that it is stopped by a piece of paper
- can cause chemical changes in matter
- moves out from a source in all directions, becoming weaker with distance
- is from the transformation of an atom of one element into an atom of another element
- cannot be felt or seen, but can be detected with proper instruments
- radiates from natural sources, which are all around us and in our bodies

RADIATION DOSE

Radiation dose is the energy absorbed in an object from exposure to ionizing radiation. Radiation dose is measured in a unit called the Rad. The REM is a special unit of dose that represents the effects of radiation on humans. The NRC has set limits on the amount dose an individual can receive. Some dose effects and limits are listed below:

Radiation Dose	Significance
1000 REM	Lethal dose for any person
100 REM	Mild radiation sickness
10 REM	No detectible physical effects
<0.30 REM/Yr	Michigan's background dose
<0.02 REM/Yr	A MSU rad worker's avg. dose

Easy Rules for Avoiding Radiation

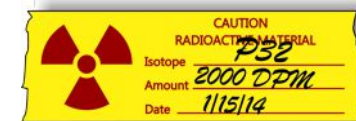
Follow these rules to minimize your chances for a radiation dose:

- Identify yourself to lab workers
- **Do not enter** radiation labeled areas alone
- Ask questions about work areas
- **Do not touch** radioactive labeled items or areas
- **Do not touch** any items if not necessary
- Do not try to clean work areas
- Do not ignore barriers or area restrictions
- Follow instructions during an incident

RADIATION WARNING SIGNS & LABELS

Ionizing radiation's presence is identified by specific labels and signs. Shown below are some example labels. Labels include units and terms that describe the relative hazard degree. Labels will be found on objects, containers, equipment, & doors. All labels should be heeded and assumed to be accurate at all times.

This label is used to notify persons of the presence of radioactive material. It is used to label rooms, work areas, storage areas and equipment. There are no special risks present, other than the likely presence of radiation.



This is a common radioactive label used to indicate the presence of radioactive material. They can be found on equipment, bottles, boxes, counters, equipment and contaminated areas. The units of activity, **DPM**, **mCi**, **µCi**, and **Bq** will appear as part of this label. Avoid contact with items and work areas having this type of label.



These labels warn of areas where high radiation exposures will likely occur. Warnings may state "Hazard" or "Danger" as part of the label. The units of dose, **R**, **mR**, **REM** and **mREM**, are associated with these signs. Do not enter these areas without authorization from the EHS.



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