# Personnel Monitoring-Radiation Safety

The University is committed to the concept of personnel radiation exposures being as low as reasonably achievable "ALARA" and the following guidelines shall be observed:

**Dose Restrictions for Radiation Workers**

- The radiation dose to minors and an embryo/fetus shall not exceed 10 percent of the limits stated below. The radiation dose to all other radiation workers shall not exceed an annual total effective dose equivalent of:
    - 500 mrem (0.005 Sievert) to the whole body; or
    - 1500 mrem (0.015 Sievert) to the lens of the eye; or
    - 5000 mrem (0.05 Sievert) shallow dose to the skin or any extremity.
- In keeping with the ALARA policy, the Radiation Control and Policy Committee recommends that doses to radiation workers be limited to 10 percent of the dose limits described above, adjusted to quarterly criteria. Any monitored individual exceeding these quarterly dose limits will be notified by the Radiation Safety Officer (RSO) so that they may be able to modify their techniques to reduce their radiation exposure.
- Declared pregnant workers may be occupational radiation workers provided that they follow all applicable personnel monitoring and dose restrictions outlined above, and ensure that assigned whole body dosimetry is worn at waist level at all times while at work, per Chapter 64E-5.311(5), FAC.
- In accordance with state law, no minors may work with radioactive materials.

**Dose Restrictions to Individual Members of the Public**

All operations involving the use of radiation shall be conducted in such a way to restrict the total effective dose equivalent to individual members of the public (non-radiation workers) as follows:

- 0.05 rem (0.5 millisievert) per year to the whole body; or
- 2 mrem (0.02 millisievert) in any one hour.
- Concentrations of radioactive materials in gaseous and liquid effluents not exceeding 10 percent of the values specified in Table II 64E-5.313.

**Personnel Monitoring Policies**

- All personnel entering areas where a whole-body personnel dosimeter has been deemed to be appropriate shall wear the device in the position that will likely indicate the highest whole body dose (e.g., between chest and waist level, outside of clothing).
- Personnel working with radioactive materials, that are issued an extremity dosimeter (such as a ring dosimeter), shall wear the dosimeter on a finger with the sensitive portion of the dosimeter toward the palm of their hand; i.e., closest to the source of radiation, so that the finger does not shield the dosimeter from the radiation. Those working with other sources of radiation; e.g., x-ray diffraction units, shall wear the ring dosimeter with the sensitive portion on their finger facing the radiation source.
- Ring dosimeters shall be worn under gloves when necessary to prevent device contamination.

- Radiation workers issued any type of personnel monitoring device, extremity or whole-body, shall not allow their assigned device to be worn by any other person.
- Radiation workers will be issued a ring dosimeter on the following basis:
    - If the individual regularly handles millicurie amounts of energetic beta emitters (> 300 KeV) or gamma/x-ray emitters (e.g., iodine-131); or
    - If the Principal Investigator or radiation worker requests that a ring dosimeter be assigned, as long as the radiation source is detectable by the dosimeter; or
    - If the RSO feels that extremity monitoring is warranted.

**Theory of Luminescent Dosimetry -"Thermo" (TLD) or "Optically Stimulated" (OSLD)**

Energy from ionizing radiation raises molecules of the detector material (such as lithium fluoride, calcium fluoride or aluminum oxide) to metastable states. The detector material remains in an excited state until it is stimulated by heating to a relatively high temperature (typically 150-300°C) or exposed to a laser, causing the trapped energy to be released as light. The OSLD or TLD reader contains a photomultiplier tube that detects the light emitted from the material as it is heated. The amount of light emitted is directly proportional to the amount of radiation to which the dosimeter was previously exposed.