



Radiation Dose Limits

Radiation Safety Training

Module 3

- This module will address Western Kentucky University radiation dose limits.
- Basis for WKU limits
 - Kentucky Administrative Regulations, specifically 902 KAR 100:019

Radiation Dose Limits Overview

Annual Maximum Permissible Dose Limits		
5,000 mrem (5 rem)	50 mSv (0.05 Sv)	Whole Body Deep Dose Equivalent
50,000 mrem (50 rem)	500 mSv (0.5 Sv)	Whole Body Shallow Dose Equivalent
15,000 mrem (15 rem)	150 mSv (0.15 Sv)	Lens of Eye Dose Equivalent
50,000 mrem (50 rem)	500 mSv (0.5 Sv)	Extremities
500 mrem (0.5 rem)/ gestation period	5 mSv (0.005 Sv)/ gestation period	Declared Pregnant Worker
100 mrem (0.1 rem)/year	1 mSv (0.001 Sv)/year	Member of the Public

Dose Limits

- Whole body
 - The whole body includes the head, trunk (including male gonads), arms above the elbow, or legs above the knee. These locations contain most of the blood-producing and vital organs.
 - The whole body dose equivalent limit is based on the sum of internal and external dose.
- Lens of the eye
 - tissue depth of 0.3 centimeter (300 mg/cm²).
- Extremities
 - The hand, elbow, arm below the elbow, foot, knee, or leg below the knee.
 - Extremities can withstand a much larger dose than the whole body because there are no major blood-producing organs located here.
- Skin and Other Organs
 - Tissue depth of 0.007 centimeter (seven (7) mg/cm²) averaged over an area of one (1) square centimeter.

Definitions

- Declared pregnant worker: Embryo/fetus
 - After a female worker voluntarily notifies her employer in writing that she is pregnant, she is considered a declared pregnant worker. A form to declare pregnancy is available in Appendix K of the WKU Radiation Safety Manual or Appendix E of the WKU Radiation Producing Machines Safety Manual.
 - A special limit for radiation dose to the fetus/embryo is required.
 - The employer may provide the option of a mutually agreeable assignment of work tasks, with no loss of pay or promotional opportunity, such that further occupational radiation exposure is unlikely.
 - This declaration may be revoked, in writing, at anytime by the declared pregnant worker.
 - Measures must be taken to avoid substantial variation above the uniform exposure rate necessary to meet the 500 mrem limit for the gestation period.

Definitions

- Members of the public
 - Members of the public are WKU employees visitors, members of the general public, etc. that do not use radioactive materials or radiation producing machines, but may potentially receive small doses due to the radiation activities of WKU

Definitions

- It is each employee's responsibility to comply with the prescribed dose limits.
- If you suspect that dose limits or action levels are being approached or exceeded, you should notify your supervisor and the RSO immediately.

Worker Responsibilities Regarding Dose Limits

- Although most X-ray workers do not receive radiation doses near the regulatory limit, it is important to recognize that X-ray device-related accidents have occurred when proper procedures have not been followed.
- Failure to follow proper procedures has been the result of:
 - Rushing to complete a job
 - Boredom
 - Fatigue
 - Illness
 - Personal problems
 - Lack of communication
 - Complacency

- *Radiological Worker Training*, DOE Handbook, DOE-HDBK-1130-98, October 1998, Reaffirmation with Errata May 2004, Change Notice No. 1, February 2005.
- *Radiological Safety Training for Radiation-Producing (X-Ray) Devices*, DOE Handbook, DOE-HDBK-1109-97, August 1997, Reaffirmation with Errata July 2002
- WKU Radiation Safety Manual, Revised 2011
- WKU Radiation Producing Machines Safety Manual, 2006, Revised 2011
- 902 KAR 100:010. Definitions for 902 KAR Chapter 100. <http://www.lrc.state.ky.us/kar/902/100/010.htm>

References