

UNIVERSITY OF SOUTH CAROLINA
RADIATION SAFETY POLICY NO. 12

USC NOVEMBER 1985
(Revised May 2011)

Radiation Dose to the Embryo/Fetus

A. Policy and Purpose

This policy is designed to inform University employees of the potential health risks to the embryo/fetus from exposure to ionizing radiation and to satisfy the requirements of the revision to S.C. Regulations R61-63 (Title A) and R61-64 (Title B).

B. Definitions

1. bioassay - determination of kinds, quantities, concentrations and locations of radioactive material in the body whether by direct measurement (in-vivo) or by analysis and evaluation of materials excreted or removed from the body;
2. committed effective dose equivalent – projected dose to the body from internal radiation sources, through inhalation, ingestion or absorption; (Note: CEDE does not apply to x-ray users)
3. declared pregnancy- when a University employee officially declares, in writing, her condition to the Radiation Safety Officer; by completing the "Declaration of Pregnancy" form.
4. deep-dose equivalent (DDE) – whole body dose at a depth of 1 cm from an external source of radiation;
5. embryo/fetus - official term used in the regulations which refers to the developing human organism from conception until the time of birth;
6. occupationally exposed- exposure of a person who normally works with radiation as a part of the job, as opposed to exposure received from a medical exposure.

C. Responsibilities

1. The principal investigator will take precautions to ensure that the declared pregnant employee/student does not exceed a dose to the embryo/fetus in excess of the limits established by State regulations and will ensure that substantial variations above a uniform monthly exposure rate are avoided. In addition, the principal investigator will work with the Radiation Safety Officer to determine if additional precautions or engineering controls are necessary to reduce potential radiation exposure.
2. The individual user (pregnant employee/student) has the responsibility of deciding when or whether to formally declare her pregnancy to the Radiation Safety Office. In addition, she must take all of the precautions necessary to keep her exposure and the exposure to the embryo/fetus as low as reasonably

achievable.

3. The radiation safety officer will ensure that a declared pregnant employee/student is fully aware of the potential risks to the embryo/fetus and will ensure that radiation dose to the embryo/fetus is below the limits established by State regulations.

D. Procedures

1. Since the developing embryo/fetus is considered relatively radiosensitive, all employees/students who have the potential of becoming pregnant must be informed of the potential risks associated occupational exposure of the embryo/fetus to ionizing radiation. In addition, they must also be informed of the proper controls to be employed to limit the risk. Detailed information related to this matter can be found in the NRC Regulatory Guide 8.13, "Instructions Concerning Prenatal Radiation Exposure".
2. In order to properly monitor the external and internal dose to the employee/student and the embryo/fetus, it is strongly suggested that the pregnant worker declare her condition to the radiation safety officer as soon as possible using form (EHS-F-RAD-009). However, it is the responsibility of the pregnant worker to decide when or whether she wishes to formally declare her condition. If a University employee/student wishes to declare her pregnancy, she must do so by completing the form and returning it to the Radiation Safety Office.
3. The dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant employee/student, must not exceed 0.5 rem. The dose to the embryo/fetus is determined by the sum of the deep dose equivalent (external dose) to the declared pregnant employee/student and the committed dose equivalent (internal dose) from radionuclides in the embryo/fetus and the declared pregnant worker.
4. External dose to the embryo/fetus will be monitored with a whole body dosimeter, (if appropriate) that will be placed in the abdominal region.
5. Air samples of the work area or bioassay (urine samples) from the declared pregnant employee/student may be necessary to properly assess internal doses from radiation exposure. The Radiation Safety Officer will advise the employee about whether either of these steps is necessary for her particular use of radiation.

6. South Carolina Regulations R61-63 and R61-64 states that efforts must be made to avoid substantial variation above a uniform monthly exposure rate (.05 rem) to a declared pregnant employee/student.
7. Any employee/student may alter work routines to further reduce radiation exposure if the proposed alterations are approved by the principal investigator.
8. Accidental exposures to a declared employee/student that are deemed to be potentially significant by the employee and/or supervisor, will be immediately evaluated by the Radiation Safety Officer.

E. References

1. Nuclear Regulatory Guide 8.13, "Instructions Concerning Prenatal Radiation Exposure".
2. "Radiation Dose to the Embryo/Fetus." SC Bureau of Radiological Health Licensing Guide, October, 1993.