The University of Houston

Pregnant Employee's Guide to Radiation

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To assist the occupationally-exposed pregnant employee to assess the potential risks to the unborn child, this document will explain in general the risks associated with radiation exposure during pregnancy. The UH guidelines regarding fetal dose incorporates safety information and radiation dose regulations to ensure safe radiation exposure limits to the embryo/fetus of occupationally exposed employees.

Adverse health effects from exposure to ionizing radiation are thought to have a direct relationship to the dose of radiation received. Experts assume that, any level of ionizing radiation has a potential for causing some biological damage because scientific research has not proven otherwise. In effect, the research postulates that there is a theoretical, non-zero risk at low doses and low dose rates, i.e. no known amount of ionizing radiation below which adverse health effects may not occur.

The Nuclear Regulatory Commission (NRC)[1] has adopted a risk value for an occupational dose of 1 rem (0.01 Sv) Total Effective Dose Equivalent (TEDE) of 4 in 10,000 of developing a fatal cancer, or approximately 1 chance in 2,500 of fatal cancer per rem of TEDE received. The uncertainty associated with this risk estimate does not rule out the possibility of higher risk, or the possibility that the risk may even be zero at low occupational doses and dose rates. This is based on the assumptions that the dose is delivered incrementally within the year (the risk is somewhat higher for a single exposure of this magnitude). Therefore, for radiation protection purposes, it is prudent to assume that even small amounts of radiation present some level of risk.

Prenatal Radiation Exposure

Studies of pre-conception risks show that there is a small amount of risk associated with radiation exposure of sperm or ova before conception. The probability is estimated as 1.5 per 1,000,000 for the 0.1 rem (1 mSv) maximum permissible dose. The current incidence of genetic abnormalities in the general population is greater than 42,000 per 1,000,000 live births. Thus the incremental risk of 1.5 per million is almost negligible for this category of exposure.

Effects on the embryo/fetus

The risk of radiation to a developing fetus is complex and not fully understood. Different effects take place at different stages of fetal development. The embryo/fetus is more sensitive to radiation damage than adults. During the first trimester, the embryo/fetus is especially susceptible to radiation exposure. Therefore, if you are considering a declaration of pregnancy, it is best to declare as soon as possible for full embryo/fetus monitoring.

Radiation Dose Limits

The sensitivity to radiation of the unborn child is taken into account in the recommendations for radiation protection purposes. A dose equivalent to the embryo/fetus from occupational exposures of 500 mrem has been recommended by the NRC and the Texas Department of State Health Services (DSHS). This limit, based on a review of available scientific literature provides an adequate margin of protection and reflects the intention to limit the total lifetime risk of leukemia and other cancers associated with radiation exposure during pregnancy.

A pregnant worker can decide to keep her pregnancy confidential; or officially declare her pregnancy to the Radiation Safety Officer (RSO). A pregnant worker must voluntarily declare her pregnancy to take advantage of the lower exposure limits and dose monitoring provisions specified in the regulations. These requirements are implemented to prevent discrimination on the job. ***A declared pregnancy is one in which the pregnant employer voluntarily informs her employer, in writing, of her pregnancy and gives the estimated date of conception[2].***

Instructions for Pregnancy Declaration

To formally declare her pregnancy at the University of Houston, the pregnant employee must voluntarily inform the RSO in writing of her pregnancy, stating the estimated date of conception using the designated form on the other side of the brochure. The Declaration of Pregnancy form is also found in the Radiation Safety Manual[3]. Complete the required information, sign and submit the form to the RSO in Environmental Health and Life Safety (EHLS) MC-1005. The declaration will remain in effect until completion of pregnancy up to one year after submission unless the employee withdraws the declaration. The employee may decide to undeclare the declaration of pregnancy at any time without explanation, but it must also be submitted to the RSO in writing.

Pregnancy is Declared

In general, occupational exposures are low for radiation workers at the UH, but it is a regulatory requirement to limit the radiation dose from occupational exposure to 500 mrem during the duration of pregnancy and not to exceed 50 mrem per month. The RSO must also follow other regulatory requirements related to the declaration. You will be given a monthly radiation badge to be worn around the waist area. This is in addition to any badge the employee may have been assigned.

Any options such as modification of radiation work will be discussed between the employee, the RSO and the departmental supervisor. You may also ask your supervisor for a job that does not involve any exposure to occupational radiation dose, but UH is not obligated to provide you with a job involving no radiation exposure. The final decision on the level of acceptable risk remains solely with the employee.

Pregnancy is Undeclared

To withdraw the pregnancy declaration, submit the request in writing to the RSO by signing the bottom portion of the Pregnancy Declaration Form. Once withdrawn, the lower dose limit will no longer apply and the monthly fetal dose monitor will be discontinued. Again, no explanation is required.

Further information to pregnant employees in making decisions regarding radiation exposure during pregnancy is provided in the references below which are included in the radiation safety training courses handout materials.

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[1] ***US NRC Regulatory Guide 8.29: Instruction Concerning Risks from Occupational Radiation Exposure, 1996.***

[2] ***US NRC Regulatory Guide 8.13: Instruction Concerning Prenatal Radiation Exposure 1999.***

[3] ***UH Radiation Safety Manual***
http://www.uh.edu/ehls/research-lab/radiation-safety/

UNIVERSITY OF HOUSTON
Radiation Safety Manual

Declaration of Pregnancy Form

Section I. Voluntary Declaration of Pregnancy

In accordance with the Texas regulations for Control of Radiation in 25 TAC 289.202 (m) (1), "*Dose equivalent to an embryo/fetus*", I voluntarily declare that I am pregnant. My estimated date of conception is (Month and year) _____ as regulatory required.

I understand that, the dose equivalent to my embryo/fetus during my entire pregnancy will not be allowed to exceed 0.5 rem (5 mSv) *unless this limit has already been exceeded between the time of conception and the date of declaration as stated*. By attesting this document, I understand that I have met the definition of a declared pregnant woman[1].

_____ _____
Signature and Date Employee/Student ID

_____
Name (Printed)

Section II. Rescinding Pregnancy Declaration

The pregnant worker may undeclare the above declaration in writing at any time without explanation and the dose monitoring will be discontinued and the applicable radiation worker occupational dose limits will apply.

I, _____, declare that I no longer wish to be considered a declared pregnant woman.

_____ _____
Signature and date Employee/Student ID

[1] 25 TAC 289.202 (c) (7) *defines a declared pregnant woman as: A woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect unless the declared pregnant woman voluntarily withdraws the declaration in writing or is no longer pregnant.*