



ENVIRONMENTAL HEALTH & SAFETY

SANTA CRUZ, CALIFORNIA 95064

RADIATION SAFETY AND BIOSAFETY COMMITTEE

PRENATAL RADIATION EXPOSURE POLICY

August 22, 1997

RADIATION USE PERMITTEES**Re: Prenatal Radiation Exposure Policy****Dear Principal Investigator,**

Federal and State regulations require that all individuals working in or frequenting any portion of a restricted area to be instructed in the health protection problems associated with exposure to radioactive materials or radiation, in precautions or procedures to minimize exposure, and in the regulations that they are expected to observe. This packet provides information to workers and supervisors concerning biological risks to the embryo/fetus exposed to radiation, suggestions for reducing exposure and also the current regulations regarding prenatal exposure and female worker's rights. Please ensure that all women working under your permit read these materials and sign and return form 1 to me. Form 1 indicates that the worker has received the prenatal exposure packet. If you have any questions about this information, please call me at 9-3911.

Sincerely,



**Ken Smith
Radiation Safety Officer**

University of California, Santa Cruz
Radiation Safety Committee

PRENATAL RADIATION EXPOSURE POLICY

A. DEFINITIONS

Declared Pregnant Woman is a woman who, in accordance with federal and state regulations, voluntarily informs the UCSC Radiation Safety Officer, in writing, of her pregnancy and the estimated date of conception.

Total Effective Dose Equivalent (TEDE) to the declared pregnant woman is the sum of her Deep Dose Equivalent and her Committed Effective Dose Equivalent.

- **Deep Dose Equivalent (DDE)** is the dose from external exposure due to gamma, x-ray or neutron radiation (measured by, for example, the heavily shielded area of a film badge).
- **Committed Effective Dose Equivalent (CEDE)** is the weighted sum of the doses from internal exposure to all organs and tissues of the body over the 50 years after intake from radioactive materials taken into the body (measured by, for example, thyroid counts or urine radiochemistry).

The **Dose Equivalent to the Embryo/Fetus** is the total dose equivalent to the embryo/fetus during the entire 9 month gestation period. It is the sum of:

- The Deep Dose Equivalent to the declared pregnant woman during pregnancy.
- The dose equivalent to the embryo/fetus from radionuclides in the embryo/fetus during pregnancy. It is the actual dose received, not a committed dose to be received over a period of up to 50 years.
- The dose equivalent to the embryo/fetus from radionuclides in the declared pregnant woman during pregnancy.

B. FEDERAL AND STATE REGULATIONS

Federal and state regulations for dose limits and individual monitoring of women who are pregnant and their developing embryo/fetuses are as follows:

1. A declared pregnant woman is limited to a **Dose Equivalent to the Embryo/Fetus** of 500 millirems during her pregnancy, delivered at a recommended rate of approximately 50 millirems per month or less.
2. A declared pregnant woman is required to be monitored for doses from external exposure if she is likely to receive, while she is pregnant, a **DDE** of greater than 50 millirems per year.

1. **A declared pregnant woman is required to be monitored for doses from internal exposure if she is likely to receive, while she is pregnant:**
 - a. **A CEDE of greater than 50 millirems per year, or,**
 - b. **A Dose to the Embryo/Fetus of greater than 50 millirems per year from radionuclides in the embryo/fetus and in the declared pregnant woman.**
2. **If a pregnant woman chooses not to become a declared pregnant woman, the appropriate dose limits and monitoring procedures apply based on her status as an adult or a minor under age 18.**

C. UCSC PROCEDURES FOR WOMEN WHO ARE PREGNANT

The UCSC campus has adopted specific procedures regarding radiation exposure to women who are pregnant or who are planning to become pregnant.

1. Exposure of Pregnant Women

- a. **Federal and state regulatory agencies have established the category of declared pregnant woman in order to address two competing objectives of national policy. These objectives are:**
 - 1) **The desire to establish a legal mechanism to offer special protection to the developing embryo/fetus by limiting external and internal doses to levels lower than those established for the mother.**
 - 2) **Decisions of the U.S. Supreme Court which prohibit the establishment of mandatory legal dose limits for women which are lower than the legal dose limits for men.**
- b. **Therefore, each woman must choose to become a declared pregnant woman if she wants to have voluntary lower legal dose limits for the exposure of her developing embryo/fetus.**
- c. **UCSC procedures establish administrative criteria for external and/or internal dosimetry for declared pregnant women which are often lower (e.g., for penetrating gamma radiation emitters) than those established for adults who are not declared pregnant women.**

- d. Radiation emitted by radionuclides that are pure beta emitters (e.g., which do not emit gamma rays) will not penetrate into the uterus. Therefore, external exposure from P-32 and other beta emitters should not be of concern to prospective mothers.

2. Specific Information for Prospective Mothers

It is UCSC's campus policy to inform female radiation workers (employees and students) of:

- a. The risks to the developing embryo/fetus from exposures to ionizing radiation.
- b. The options available to prospective mothers to maintain such exposures as low as reasonably achievable below the in utero legal limit of 500 millirem (for declared pregnant women) during pregnancy for external and internal exposures.
- c. That all such workers are strongly encouraged to contact the EH&S Office if they have any questions regarding radiation exposures during pregnancy.

3. Special Precautions for Prospective Mothers

Precautions required or recommended for prospective mothers (i.e., those who are pregnant or who are actively trying to become pregnant) who choose to continue working with or around radioactive materials and/or radiation producing equipment, include:

- a. The prospective mother should avoid situations where her abdomen may be exposed to penetrating radiation (gamma, x-ray, neutron) levels greater than 2 millirems per hour or 10 millirems per week.
- b. Protective aprons may be worn, if appropriate, for the energy and type of radiation encountered. Thin lead aprons may be used for x-rays, but they are not recommended for use with gamma emitters (such as Cr-51) or high energy beta emitters (such as P-32).
- c. The EH&S Office may issue a radiation dosimeter to a declared pregnant woman to be used as a "fetal monitor" to assess penetrating radiation exposures (from external sources) to the prospective mother's abdomen whenever it is likely to receive a deep dose equivalent of more than 50 millirems in a year and the woman's usual dosimeter is likely to measure doses that are less than the doses to the abdomen.

- d. If the deep dose equivalent to the fetal monitor of a declared pregnant woman equals or exceeds 50 millirems per month for more than two consecutive months of a pregnancy, the prospective mother's work will usually be reviewed to determine if restrictions are necessary to reduce further exposures during the remainder of the pregnancy.
- e. If the dose equivalent to the embryo/fetus of a declared pregnant woman exceeds 500 millirems during her pregnancy, the woman will normally be required to avoid all further occupational and educational radiation exposures until after the birth of her baby.
- f. The prospective mother should avoid working with volatile or reactive radiochemicals which could result in the inhalation, ingestion, or absorption of radioactive materials through her skin.
 - 1) While pregnant, she should not perform either iodinations using radioiodine or labeling procedures using tritiated water or borohydride.
 - 2) Nursing mothers should also avoid such procedures.
- g. In any case of suspected accidental exposure to radiation sources or intake of radioactive materials, the prospective mother should contact the EH&S Office immediately, or call campus police after hours, or on weekends or holidays.



ENVIRONMENTAL HEALTH & SAFETY

SANTA CRUZ, CALIFORNIA 95064

University of California, Santa Cruz
Radiation Safety Committee

PRENATAL RADIATION EXPOSURE RISKS AND PRECAUTIONS

I have received information regarding the risks of prenatal radiation exposure to the developing embryo/fetus, the limits for such exposure and the UCSC policy and options available to me to maintain such exposures as low as reasonably achievable (ALARA) .

If I wish to continue working with and/or around radiation sources while I am pregnant, I understand that UCSC policy encourages me:

- (1) To become a declared pregnant woman by notifying the UCSC Radiation Safety Officer, in writing, of my pregnancy and the estimated date of conception.
- (2) To consult with EH&S as early as possible to discuss any particular concerns which I may have regarding this issue.

The following information entered on this form is typed, or is printed or signed in ink.

(Responsible P.I.'s Name)

(My Full Legal Name Printed)

(Department)

(My Signature)

(Date of Signature)

PLEASE RETURN THIS FORM TO THE UCSC RADIATION SAFETY OFFICER
ENVIRONMENTAL HEALTH AND SAFETY OFFICE.



ENVIRONMENTAL HEALTH & SAFETY

SANTA CRUZ, CALIFORNIA 95064

NOTIFICATION OF STATUS AS A DECLARED PREGNANT WOMAN

I hereby voluntarily notify the UCSC Radiation Safety Officer of my pregnancy in order to become a declared pregnant woman to insure that the external and internal radiation exposures of my developing embryo/fetus are legally limited to special reduced dose limits.

I understand that I am required by federal and state regulations to furnish the estimated date of conception in order to become a declared pregnant woman.

The following information entered on this form is typed, or is printed or signed in ink.

(Responsible P.I.'s Name)

(My Full Legal Name Printed)

(Department)

(Estimated Date of Conception)

I have checked all applicable items, with information entered as appropriate, to indicate my status as a radiation worker at UCSC:

- I currently work, or have worked since becoming pregnant, with the following:
Radioisotopes _____
Radiation Producing Machines _____
- I wear, or have worn since becoming pregnant, a radiation badge on my body to monitor my exposure to external radiation.
- I currently work, or have worked since becoming pregnant, with I-125 in the form of sodium iodide.
- I currently work, or have worked since becoming pregnant, with tritium in the form of water or borohydride.

I certify that the information contained in this notification is true and correct to the best of my knowledge.

(My Signature)

(Date of Signature)

PLEASE RETURN THIS FORM TO THE UCSC RADIATION SAFETY OFFICER
ENVIRONMENTAL HEALTH AND SAFETY OFFICE.



U.S. Nuclear Regulatory Commission
REGULATORY GUIDE
Office of Nuclear Regulatory Research

REGULATORY GUIDE 8.13
(Draft was issued as DG-8014)

INSTRUCTION CONCERNING PRENATAL RADIATION EXPOSURE

A. INTRODUCTION

The Code of Federal Regulations in 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," in Section 19.12, "Instructions to Workers," requires instruction in "the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed." The instructions must be "commensurate with potential radiological health protection problems present in the work place."

The Nuclear Regulatory Commission's (NRC's) regulations on radiation protection are specified in 10 CFR Part 20, "Standards for Protection Against Radiation"; and 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to "ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv)." Section 20.1208 also requires licensees to "make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman." A declared pregnant woman is defined in 10 CFR 20.1003 as a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception.

This regulatory guide is intended to provide information to pregnant women, and other personnel, to help them make decisions regarding radiation exposure during pregnancy. This Regulatory Guide 8.13 supplements Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure" (Ref. 1), which contains a broad discussion of the risks from exposure to ionizing radiation.

Other sections of the NRC's regulations also specify requirements for monitoring external and internal occupational dose to a declared pregnant woman. In 10 CFR 20.1502, "Conditions Requiring Individual Monitoring of External and Internal Occupational Dose," licensees are required to monitor the occupational dose to a declared pregnant woman, using an individual monitoring device, if it is likely that the declared pregnant woman will receive, from external sources, a deep dose equivalent in excess of 0.1 rem (1 mSv). According to Paragraph (e) of 10 CFR 20.2106, "Records of Individual Monitoring Results," the licensee must maintain

records of dose to an embryo/fetus if monitoring was required, and the records of dose to the embryo/fetus must be kept with the records of dose to the declared pregnant woman. The declaration of pregnancy must be kept on file, but may be maintained separately from the dose records. The licensee must retain the required form or record until the Commission terminates each pertinent license requiring the record.

The information collections in this regulatory guide are covered by the requirements of 10 CFR Parts 19 or 20, which were approved by the Office of Management and Budget, approval numbers 3150-0044 and 3150-0014, respectively. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

B. DISCUSSION

As discussed in Regulatory Guide 8.29 (Ref. 1), exposure to any level of radiation is assumed to carry with it a certain amount of risk. In the absence of scientific certainty regarding the relationship between low dose exposure and health effects, and as a conservative assumption for radiation protection purposes, the scientific community generally assumes that any exposure to ionizing radiation may cause undesirable biological effects and that the likelihood of these effects increases as the dose increases. At the occupational dose limit for the whole body of 5 rem (50 mSv) per year, the risk is believed to be very low.

The magnitude of risk of childhood cancer following in utero exposure is uncertain in that both negative and positive studies have been reported. The data from these studies “are consistent with a lifetime cancer risk resulting from exposure during gestation which is two to three times that for the adult” (NCRP Report No. 116, Ref. 2). The NRC has reviewed the available scientific literature and has concluded that the 0.5 rem (5 mSv) limit specified in 10 CFR 20.1208 provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers associated with radiation exposure during pregnancy.

In order for a pregnant worker to take advantage of the lower exposure limit and dose monitoring provisions specified in 10 CFR Part 20, the woman must declare her pregnancy in writing to the licensee. A form letter for declaring pregnancy is provided in this guide or the licensee may use its own form letter for declaring pregnancy. A separate written declaration should be submitted for each pregnancy.

C. REGULATORY POSITION

1. Who Should Receive Instruction

Female workers who require training under 10 CFR 19.12 should be provided with the information contained in this guide. In addition to the information contained in Regulatory Guide 8.29 (Ref. 1), this information may be included as part of the training required under 10 CFR 19.12.

2. Providing Instruction

The occupational worker may be given a copy of this guide with its Appendix, an explanation of the

contents of the guide, and an opportunity to ask questions and request additional information. The information in this guide and Appendix should also be provided to any worker or supervisor who may be affected by a declaration of pregnancy or who may have to take some action in response to such a declaration.

Classroom instruction may supplement the written information. If the licensee provides classroom instruction, the instructor should have some knowledge of the biological effects of radiation to be able to answer questions that may go beyond the information provided in this guide. Videotaped presentations may be used for classroom instruction. Regardless of whether the licensee provides classroom training, the licensee should give workers the opportunity to ask questions about information contained in this Regulatory Guide 8.13. The licensee may take credit for instruction that the worker has received within the past year at other licensed facilities or in other courses or training.

3. Licensee's Policy on Declared Pregnant Women

The instruction provided should describe the licensee's specific policy on declared pregnant women, including how those policies may affect a woman's work situation. In particular, the instruction should include a description of the licensee's policies, if any, that may affect the declared pregnant woman's work situation after she has filed a written declaration of pregnancy consistent with 10 CFR 20.1208.

The instruction should also identify who to contact for additional information as well as identify who should receive the written declaration of pregnancy. The recipient of the woman's declaration may be identified by name (e.g., John Smith), position (e.g., immediate supervisor, the radiation safety officer), or department (e.g., the personnel department).

4. Duration of Lower Dose Limits for the Embryo/Fetus

The lower dose limit for the embryo/fetus should remain in effect until the woman withdraws the declaration in writing or the woman is no longer pregnant. If a declaration of pregnancy is withdrawn, the dose limit for the embryo/fetus would apply only to the time from the estimated date of conception until the time the declaration is withdrawn. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission.

5. Substantial Variations Above a Uniform Monthly Dose Rate

According to 10 CFR 20.1208(b), "The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section," that is, 0.5 rem (5 mSv) to the embryo/fetus. The National Council on Radiation Protection and Measurements (NCRP) recommends a monthly equivalent dose limit of 0.05 rem (0.5 mSv) to the embryo/fetus once the pregnancy is known (Ref. 2). In view of the NCRP recommendation, any monthly dose of less than 0.1 rem (1 mSv) may be considered as not a substantial variation above a uniform monthly dose rate and as such will not require licensee justification. However, a monthly dose greater than 0.1 rem (1 mSv) should be justified by the licensee.

D. IMPLEMENTATION

The purpose of this section is to provide information to licensees and applicants regarding the NRC staff's plans for using this regulatory guide.

Unless a licensee or an applicant proposes an acceptable alternative method for complying with the specified portions of the NRC's regulations, the methods described in this guide will be used by the NRC staff in the evaluation of instructions to workers on the radiation exposure of pregnant women.

REFERENCES

1. USNRC, "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, Revision 1, February 1996.
2. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation*, NCRP Report No. 116, Bethesda, MD, 1993.

APPENDIX

QUESTIONS AND ANSWERS CONCERNING PRENATAL RADIATION EXPOSURE

1. Why am I receiving this information?

The NRC's regulations (in 10 CFR 19.12, "Instructions to Workers") require that licensees instruct individuals working with licensed radioactive materials in radiation protection as appropriate for the situation. The instruction below describes information that occupational workers and their supervisors should know about the radiation exposure of the embryo/fetus of pregnant women.

The regulations allow a pregnant woman to decide whether she wants to formally declare her pregnancy to take advantage of lower dose limits for the embryo/fetus. This instruction provides information to help women make an informed decision whether to declare a pregnancy.

2. If I become pregnant, am I required to declare my pregnancy?

No. The choice whether to declare your pregnancy is completely voluntary. If you choose to declare your pregnancy, you must do so in writing and a lower radiation dose limit will apply to your embryo/fetus. If you choose not to declare your pregnancy, you and your embryo/fetus will continue to be subject to the same radiation dose limits that apply to other occupational workers.

3. If I declare my pregnancy in writing, what happens?

If you choose to declare your pregnancy in writing, the licensee must take measures to limit the dose to your embryo/fetus to 0.5 rem (5 millisievert) during the entire pregnancy. This is one-tenth of the dose that an occupational worker may receive in a year. If you have already received a dose exceeding 0.5 rem (5 mSv) in the period between conception and the declaration of your pregnancy, an additional dose of 0.05 rem (0.5 mSv) is allowed during the remainder of the pregnancy. In addition, 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to make efforts to avoid substantial variation above a uniform monthly dose rate so that all the 0.5 rem (5 mSv) allowed dose does not occur in a short period during the pregnancy.

This may mean that, if you declare your pregnancy, the licensee may not permit you to do some of your normal job functions if those functions would have allowed you to receive more than 0.5 rem, and you may not be able to have some emergency response responsibilities.

4. Why do the regulations have a lower dose limit for the embryo/fetus of a declared pregnant woman than for a pregnant worker who has not declared?

A lower dose limit for the embryo/fetus of a declared pregnant woman is based on a consideration of greater sensitivity to radiation of the embryo/fetus and the involuntary nature of the exposure. Several scientific advisory groups have recommended (References 1 and 2) that the dose to the embryo/fetus be limited to a fraction of the occupational dose limit.

5. What are the potentially harmful effects of radiation exposure to my embryo/fetus?

The occurrence and severity of health effects caused by ionizing radiation are dependent upon the type and total dose of radiation received, as well as the time period over which the exposure was received. See [Regulatory Guide 8.29, “Instruction Concerning Risks from Occupational Exposure” \(Ref. 3\)](#), for more information. The main concern is embryo/fetal susceptibility to the harmful effects of radiation such as cancer.

6. Are there any risks of genetic defects?

Although radiation injury has been induced experimentally in rodents and insects, and in the experiments was transmitted and became manifest as hereditary disorders in their offspring, radiation has not been identified as a cause of such effect in humans. Therefore, the risk of genetic effects attributable to radiation exposure is speculative. For example, no genetic effects have been documented in any of the Japanese atomic bomb survivors, their children, or their grandchildren.

7. What if I decide that I do not want any radiation exposure at all during my pregnancy?

You may ask your employer for a job that does not involve any exposure at all to occupational radiation dose, but your employer is not obligated to provide you with a job involving no radiation exposure. Even if you receive no occupational exposure at all, your embryo/fetus will receive some radiation dose (on average 75 mrem (0.75 mSv)) during your pregnancy from natural background radiation.

The NRC has reviewed the available scientific literature and concluded that the 0.5 rem (5 mSv) limit provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers. If this dose limit is exceeded, the total lifetime risk of cancer to the embryo/fetus may increase incrementally. However, the decision on what level of risk to accept is yours. More detailed information on potential risk to the embryo/fetus from radiation exposure can be found in References 2-10.

8. What effect will formally declaring my pregnancy have on my job status?

Only the licensee can tell you what effect a written declaration of pregnancy will have on your job status. As part of your radiation safety training, the licensee should tell you the company's policies with respect to the job status of declared pregnant women. In addition, before you declare your pregnancy, you may want to talk to your supervisor or your radiation safety officer and ask what a declaration of pregnancy would mean specifically for you and your job status.

In many cases you can continue in your present job with no change and still meet the dose limit for the embryo/fetus. For example, most commercial power reactor workers (approximately 93%) receive, in 12 months, occupational radiation doses that are less than 0.5 rem (5 mSv) (Ref. 11). The licensee may also consider the likelihood of increased radiation exposures from accidents and abnormal events before making a decision to allow you to continue in your present job.

If your current work might cause the dose to your embryo/fetus to exceed 0.5 rem (5 mSv), the licensee has various options. It is possible that the licensee can and will make a reasonable accommodation that will allow you to continue performing your current job, for example, by having another qualified employee do a small part of the job that accounts for some of your radiation exposure.

9. What information must I provide in my written declaration of pregnancy?

You should provide, in writing, your name, a declaration that you are pregnant, the estimated date of conception (only the month and year need be given), and the date that you give the letter to the licensee. A form letter that you can use is included at the end of these questions and answers. You may use that letter, use a form letter the licensee has provided to you, or write your own letter.

10. To declare my pregnancy, do I have to have documented medical proof that I am pregnant?

NRC regulations do not require that you provide medical proof of your pregnancy. However, NRC regulations do not preclude the licensee from requesting medical documentation of your pregnancy, especially if a change in your duties is necessary in order to comply with the 0.5 rem (5 mSv) dose limit.

11. Can I tell the licensee orally rather than in writing that I am pregnant?

No. The regulations require that the declaration must be in writing.

12. If I have not declared my pregnancy in writing, but the licensee suspects that I am pregnant, do the lower dose limits apply?

No. The lower dose limits for pregnant women apply only if you have declared your pregnancy in writing. The United States Supreme Court has ruled (in *United Automobile Workers International Union v. Johnson Controls, Inc.*, 1991) that “Decisions about the welfare of future children must be left to the parents who conceive, bear, support, and raise them rather than to the employers who hire those parents” (Reference 7). The Supreme Court also ruled that your employer may not restrict you from a specific job “because of concerns about the next generation.” Thus, the lower limits apply only if you choose to declare your pregnancy in writing.

13. If I am planning to become pregnant but am not yet pregnant and I inform the licensee of that in writing, do the lower dose limits apply?

No. The requirement for lower limits applies only if you declare in writing that you are already pregnant.

14. What if I have a miscarriage or find out that I am not pregnant?

If you have declared your pregnancy in writing, you should promptly inform the licensee in writing that you are no longer pregnant. However, if you have not formally declared your pregnancy in writing, you need not inform the licensee of your nonpregnant status.

15. How long is the lower dose limit in effect?

The dose to the embryo/fetus must be limited until you withdraw your declaration in writing or you

inform the licensee in writing that you are no longer pregnant. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission.

16. If I have declared my pregnancy in writing, can I revoke my declaration of pregnancy even if I am still pregnant?

Yes, you may. The choice is entirely yours. If you revoke your declaration of pregnancy, the lower dose limit for the embryo/fetus no longer applies.

17. What if I work under contract at a licensed facility?

The regulations state that you should formally declare your pregnancy to the licensee in writing. The licensee has the responsibility to limit the dose to the embryo/fetus.

18. Where can I get additional information?

The references to this Appendix contain helpful information, especially Reference 3, NRC's Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure," for general information on radiation risks. The licensee should be able to give this document to you.

For information on legal aspects, see Reference 7, "The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children—What Can the Employer Do?" which is an article in the journal *Radiation Protection Management*.

You may telephone the NRC Headquarters at (301) 415-7000. Legal questions should be directed to the Office of the General Counsel, and technical questions should be directed to the Division of Industrial and Medical Nuclear Safety.

You may also telephone the NRC Regional Offices at the following numbers: Region I, (610) 337-5000; Region II, (404) 562-4400; Region III, (630) 829-9500; and Region IV, (817) 860-8100. Legal questions should be directed to the Regional Counsel, and technical questions should be directed to the Division of Nuclear Materials Safety.

REFERENCES FOR APPENDIX

1. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation*, NCRP Report No. 116, Bethesda, MD, 1993.
2. International Commission on Radiological Protection, *1990 Recommendations of the International Commission on Radiological Protection*, ICRP Publication 60, Ann. ICRP 21: No. 1-3, Pergamon Press, Oxford, UK, 1991.
3. USNRC, “[Instruction Concerning Risks from Occupational Radiation Exposure](#),” *Regulatory Guide 8.29*, Revision 1, February 1996.¹¹ (Electronically available at www.nrc.gov/NRC/RG/index.html)
4. Committee on the Biological Effects of Ionizing Radiations, National Research Council, *Health Effects of Exposure to Low Levels of Ionizing Radiation* (BEIR V), National Academy Press, Washington, DC, 1990.
5. United Nations Scientific Committee on the Effects of Atomic Radiation, *Sources and Effects of Ionizing Radiation*, United Nations, New York, 1993.
6. R. Doll and R. Wakeford, “Risk of Childhood Cancer from Fetal Irradiation,” *The British Journal of Radiology*, 70, 130-139, 1997.
7. David Wiedis, Donald E. Jose, and Timm O. Phoebe, “The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children—What Can the Employer Do?” *Radiation Protection Management*, 11, 41-49, January/February 1994.
8. National Council on Radiation Protection and Measurements, *Considerations Regarding the Unintended Radiation Exposure of the Embryo, Fetus, or Nursing Child*, NCRP Commentary No. 9, Bethesda, MD, 1994.
9. National Council on Radiation Protection and Measurements, *Risk Estimates for Radiation Protection*, NCRP Report No. 115, Bethesda, MD, 1993.

¹Single copies of regulatory guides, both active and draft, and draft NUREG documents may be obtained free of charge by writing the Reproduction and Distribution Services Section, OCIO, USNRC, Washington, DC 20555-0001, or by fax to (301)415-2289, or by email to <DISTRIBUTION@NRC.GOV>. Active guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161. Copies of active and draft guides are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

10. National Radiological Protection Board, *Advice on Exposure to Ionising Radiation During Pregnancy*, National Radiological Protection Board, Chilton, Didcot, UK, 1998.
11. M.L. Thomas and D. Hagemeyer, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1996," Twenty-Ninth Annual Report, NUREG-0713, Vol. 18, USNRC, 1998.²²

²²Copies are available at current rates from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328 (telephone (202)512-1800); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, VA 22161. Copies are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

FORM LETTER FOR DECLARING PREGNANCY

This form letter is provided for your convenience. To make your written declaration of pregnancy, you may fill in the blanks in this form letter, you may use a form letter the licensee has provided to you, or you may write your own letter.

DECLARATION OF PREGNANCY

To: _____

In accordance with the NRC's regulations at 10 CFR 20.1208, "Dose to an Embryo/Fetus," I am declaring that I am pregnant. I believe I became pregnant in _____ (only the month and year need be provided).

I understand the radiation dose to my embryo/fetus during my entire pregnancy will not be allowed to exceed 0.5 rem (5 millisievert) (unless that dose has already been exceeded between the time of conception and submitting this letter). I also understand that meeting the lower dose limit may require a change in job or job responsibilities during my pregnancy.

(Your signature)

(Your name printed)

(Date)

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this regulatory guide. A regulatory analysis prepared for 10 CFR Part 20, “Standards for Protection Against Radiation” (56 FR 23360), provides the regulatory basis for this guide and examines the costs and benefits of the rule as implemented by the guide. A copy of the “Regulatory Analysis for the Revision of 10 CFR Part 20” (PNL-6712, November 1988) is available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street NW, Washington, DC, as an enclosure to Part 20 (56 FR 23360).