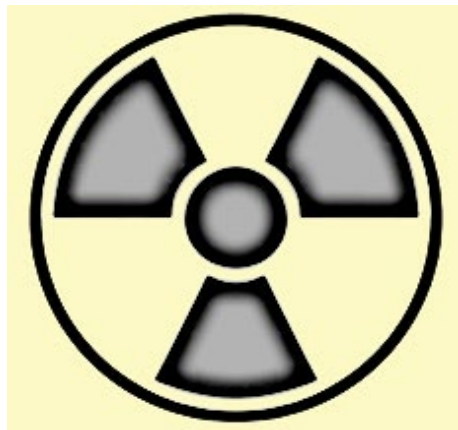


School of Nursing & Health Sciences

Radiation Safety



Manual

2025-

2026

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**Pennsylvania
College of Technology**
A Penn State Affiliate

**Although this radiation safety manual is meant to be universal among multiple Health Science programs, some information found within may pertain to only certain programs.*

Questions or concerns regarding radiation safety should be directed to the Radiation Safety Officer (RSO):

Dr. Michael Covone

Associate Professor, Applied Health Studies/RSO

Office: ATHS W226

Phone: 570-320-2400, ext. 7687

Email: mcovone@pct.edu

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U.S. Nuclear Regulatory Commission
Regulatory Guide
Office of Nuclear Regulatory Research

Pursuant to the U.S. NRC regulations, the College provides radiation safety instruction to students who will routinely work with ionizing radiation. The instruction includes an overview of the following topics: declaration of pregnancy, problems associated with exposure to ionizing radiation, precautions or procedures to minimize exposure, and the purpose and functions of protective devices provided to the student. The Regulatory Guide and Appendix are accessible to students through electronic links (see below). During the orientation program, the Guide and Appendix are reviewed with the students who confirm that they are informed about the content.

[U.S. NRC Regulatory Guide 8.13](#) Instruction Concerning Prenatal Radiation Exposure

This can be found at <https://www.nrc.gov/docs/ML0037/ML003739505.pdf>

[U.S. NRC Regulatory Guide 8.29](#) Instruction Concerning Risks from Occupational Radiation Exposure

This can also be found at <https://www.nrc.gov/docs/ML0037/ML003739438.pdf>

[Pennsylvania Code: Title 25 Environmental Protection](#)

This can also be found at

<http://www.pacodeandbulletin.gov/Display/pacode?titleNumber=025&file=/secure/pacode/data/025/025toc.html>

[Notice to Employees: Standards for Protection Against Radiation](#)

This can also be found at

<http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=9259&DocName=NOTICE%20TO%20EMPLOYEES%20-%20ENGLISH.PDF%20>

Radiation Safety Practices

The Radiation Safety Officer (RSO) reviews the radiation badge reports and counsels any student or employee with a high or questionable reading. Additionally, all clinical sites utilized by the program have an on-site RSO for similar duties of staff and, as required, students during clinical rotations.

Employees and students will always wear a dosimeter badge while in the clinical setting. Energized labs will have area monitoring. Eligible employees and students will receive a dosimeter badge from the program each calendar quarter, which will be used in all settings where the individual will be exposed to radiation. Dosimeter badges are worn at the collar and outside a protective apron. Badges are to be removed if undergoing diagnostic procedures as a patient. Radiation protection is a serious obligation and should never be taken lightly. Legal documentation is required by the program through governmental agencies. The dosimetry report readings will follow you throughout your employment.

Employees and students are required to exercise sound radiation protection practices at all times. Responsibilities include, but are not limited to:

- ❖ Wear a current dosimeter badge while in all clinical settings where they will be exposed to radiation. (Dental hygiene and welding are exceptions to this rule due to area monitoring being used.)
Individuals without a badge will not be permitted to attend a clinical or laboratory experience involving radiation.
- ❖ Immediately report to the program clinical supervisor any lost or damaged dosimeter badges.
- ❖ Read and initial the quarterly dosimeter badge report.
- ❖ Wear a protective apron while performing fluoroscopic and portable examinations.

Failure to adhere to the protocols outlined above is considered unsafe practices. At no time may an employee or student participate in a procedure using unsafe protection practices, which also include, but are not limited to:

- ❖ Taking exposures, intentionally or unintentionally, on another person without a valid physician's order. All exposures on human beings are to be taken for a medically-valid reason only.
 - ❖ Holding the image receptor during any radiographic procedure.
 - ❖ Holding a patient when an immobilization method is the appropriate standard of care.
 - ❖ Performing a portable examination without a qualified radiographer present.
 - ❖ Attempting any procedure without direct supervision until competency has been achieved.
 - ❖ Repeating radiographs without the direct supervision of a qualified registered radiographer (Radiography students) or clinic instructor (Dental Hygiene students).
 - ❖ Wearing another student's dosimeter badge.
 - ❖ Post-collimation of anatomy.
-
- ❖ **Any incidents of unsafe radiation practices will be investigated by program officials and could lead to program dismissal, per the *"Penn College School of Nursing & Health Sciences' Investigation Algorithm."* See your Program Manual.**

As Low As Reasonably Achievable (ALARA)

Appropriate policies and procedures help assure that student radiation exposure is kept as low as reasonably achievable (ALARA). The program must monitor and maintain student radiation exposure data. All students must be monitored for radiation exposure when using equipment in energized laboratories as well as in the clinical environment during, but not limited to, simulation procedures, image production, or quality assurance testing.

The concept of ALARA will be discussed during new student and employee orientation and within specific program courses. After all students have been introduced to ALARA, hospital clinical supervisors will monitor all students while in the clinic.

ALARA Limit & Protocol

Program staff and faculty at Penn College emphasize safe radiation practices in the clinical and laboratory settings. Emphasizing safe radiation practices, and according the U.S. NCRP publication No. 116, we set the upper ALARA dose limit to:

100mRem or 1mSv per year, 200mRem or 2mSv for program length (2 years), and not to exceed 50mRem or 0.5mSv in any one quarter. The radiation safety officer will investigate limits that approach 75% of the quarterly limit (i.e.: a student report of 37mRem or 0.37mSv/quarter would trigger an investigation).

If a student or employee exceeds the annual limit of 100mRem or 1mSv:

1. They will receive a notification of excessive dose.
2. They will be required to meet with the radiation safety officer (RSO) to discuss the reason(s) for the high dose.
3. They will be removed from the clinical setting until a safety action plan can be completed to avoid future excessive radiation doses.

Protocol when traveling by air and passing through TSA checkpoints or when passing through any security checkpoint (e.g., prison or courthouse) that uses an x-ray scanner:

- Dosimeters should not be transported in a checked bag.
- Do not allow the badge to go through a baggage scanner or through an x-ray scanner at a checkpoint.
- Hand the checkpoint agent/security official the dosimeter badge for visual inspection.
- If your badge does go through an x-ray scanner, notify your clinical director so that proper documentation can be sent with your badge when it is sent to the dosimeter company to be read.

Dosimeter Badge & Exposure Report Procedure

Employees and students will wear their dosimeter badges while in the clinical setting. **The primary personal monitoring device is to be positioned outside of the apron at the level of the thyroid to approximate the maximum dose to the head and neck.** In the case of a declared pregnant employee or student, a second monitoring device shall be worn under the appropriate apron at or about the level of the waist. Each employee or student should maintain consistency in positioning of the personal monitoring device.

Employees and students are required to review and initial their quarterly badge reports. The exposure reading from the final report that is received post-graduation will be emailed to the students' Penn College email account. The program provides a written report of exposure upon request or if an individual's reading is above 100mRem or 1mSv. These reports are in compliance with provisions of 25 PA Code Chapter 220 and should be retained by the student for future reference.

Lost/Non-returned Dosimeter Badges

An employee or student who loses their dosimeter badge must complete a “Lost Badge Report Form.” **Knowingly failing to report a lost badge and/or knowingly continuing in areas with ionizing radiation, including Fluoroscopy, OR, or Portable rotations without the badge will be considered a violation of radiation safety measures, which will result in sanctions up to and including program dismissal per the School of Nursing and Health Sciences’ Investigation Algorithm and the College’s Academic Dishonesty Policy.**

Lost dosimeter badges carry a “non-returned badge” fee of \$26, which includes the cost of the lost badge and a replacement badge. If it is necessary to request two-day shipping for a replacement badge, an additional shipping fee will also be assessed. Payment will be collected in the program office. Failure to remit payment of lost badge fees assessed will result in a HOLD being placed on the student’s grades/transcripts at the end of the given semester.

Students who leave their program, whether for personal or academic reasons, must return their dosimeter badge within two weeks of their withdrawal. Failure to return the badge will result in a \$26 fee as mentioned above, a hold on the student’s account, and the inability to return to the program (and possibly other Nursing & Health Sciences programs). In addition, if the badge is not returned within 60 days of withdrawal from the program, the issue will be reported as theft of loaned property to the College Police for further action.

Notice of Cumulative Radiation Dose per Calendar Year

This document will remain in effect as long as the employee or student is monitored for radiation exposure via a dosimeter badge provided by the College for educational and training purposes.

Under the provision of the U.S. NRC Subpart C Occupational Dose Limits '20.1201 Occupation dose limits for adults,' the College is required to monitor external doses and assure that the employee or student does not exceed the maximum dose of 5000mRem or 50mSv in a calendar year. The employee or student is required and responsible for informing the radiation safety officer or program director if they are currently being badged or monitored for radiation exposure at another institution. The employee or student will sign a separate form allowing the College to share dose records with facilities that also monitor their exposure.

Per U.S. NRC 20.2104, determination of prior occupational dose, the College will work with the other monitoring institutions to assure the dose to employees and students is within the 5000mRem or 50mSv maximum yearly exposure.

Employee or Student Name (printed): _____

Employee or Student Signature: _____ Date: _____

College Representative Signature: _____ Date: _____

20.2104 Determination of prior occupational dose.

<http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-2104.html>

Subpart C--Occupational Dose Limits § 20.1201 Occupational dose limits for adults

<http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-1201.html>

Release to Share Exposure Reports

In accordance with U.S. NRC regulatory guidelines, '20.2104 Determination of Prior Occupational Dose,' licensees are required to monitor external doses for employees and students to assure that they do not exceed the maximum dose of 5000mRem or 50mSv in a given year.

You are receiving this form because program officials at Penn College have been notified that the student/employee designated below is also being badged at your institution. The individual's signature below grants permission for the sharing of their monitoring reports between Penn College and your facility. This coordination of dosimeter reports shall continue until either you are notified that the individual is no longer being badged at Penn College, or until Penn College is notified that the individual is no longer being badged at your facility. This report is furnished to you under the provisions of the Nuclear Regulatory Commission regulation 10 CFR part 19. You should preserve this report for further reference. **Note:** Penn College monitors on a quarterly basis.

Signatures below authorize the shared dose information for the time the student is monitored at Penn College.

Student / Employee Name (printed): _____

Signature of Student / Employee: _____ Date: _____

Signature of Penn College RSO, or Designee: _____ Date: _____

NOTE: Information and shared reports should be submitted to Penn College's Radiation Safety Officer Dr. Michael Covone, via email at mcovone@pct.edu.

STEP 1: Upon receipt of this signed release, please provide the following information to Penn College's Radiation Safety Officer via email.

Student/Employee Name	
Name of Facility	
Name of Facility RSO/designee to whom Penn College should submit reports	
Email address for RSO or designee	

STEP 2: Upon receipt of monitoring records for the student/employee identified above, provide the following information to Penn College's Radiation Safety Officer via email.

Name of Individual		
Monitoring Period		
Deep Dose	Lens Dose	Shallow Dose

***Please include unit of measurement.**

Radiation Pregnancy Protocol

PURPOSE: This protocol has been adopted in compliance with the regulations of the United States Nuclear Regulatory Commission (“NRC”), and its Regulatory Guide 8.13 and 8.29 (the “Regulatory Guide”).

In compliance with the NRC’s Regulations, the College ensures that the dose to an embryo/fetus during the entire pregnancy of a person who has declared a pregnancy does not exceed 500mRem or 5mSv. In addition, the College will make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant person. The fetal dosimeter badge follows the same guidelines as the individual’s main dosimeter badge (see the ‘Dosimeter Badge Procedure’ later on in this section). The fetal badge is worn underneath the protective apron at the waist level. A “declared pregnant person” is a person who has voluntarily informed the College, in writing, of their pregnancy and the estimated date of conception, as provided below in this policy.

The choice of a person as to whether or not to declare their pregnancy is completely voluntary. No person is required to declare a pregnancy. If a person chooses to declare their pregnancy, or revoke such declaration, they must do so in writing (see the Voluntary Revocation of Pregnancy Declaration form on page 12). The form for declaring a pregnancy for the purposes of radiation monitoring is available later in this section and should be submitted to the program director. Further questions regarding the declaration of pregnancy or this protocol should be directed to the program director and/or the radiation safety officer.

The lower dose limit for the embryo/fetus of a declared pregnant person remains in effect until the person withdraws the declaration in writing or the declaration has expired. If not withdrawn, the declaration is considered expired one year after submission.

So long as the declaration is in effect, the lower dose limits described above will apply. However, the declaration of pregnancy does not obligate the College to ensure no radiation exposure.

If a person who is pregnant does not submit the Radiation Monitoring Declaration of Pregnancy form or withdraws the declaration of pregnancy, the embryo/fetus will continue to be subject to the same radiation dose limits that apply to other persons.

Upon submission of a Radiation Monitoring Declaration of Pregnancy form, the person will be issued a second dosimeter badge to wear at waist level **under** the lead apron. The fetal badge has a limit of 50mRem/month or 0.5mSv/month, not to exceed 500mRem or 5mSv during the entire gestational period. The fetal badge follows the same guidelines and penalties as the ‘Dosimeter Badge Procedure’ (found later in this manual).

Upon submission of a Radiation Monitoring Declaration of Pregnancy form, the individual will be requested, but not required, to provide a physician’s recommendations regarding any restrictions and/or limitations in addition to the limits on exposure addressed above. In discussing the individual’s condition with the physician, the person should apprise their physician that they will likely participate in exams where fluoroscopic x-rays are utilized, during which radiation exposure is higher than during routine radiographic examinations.

Radiation Safety and Radiation Pregnancy Protocol Review

An overview of radiation safety and the Radiation Pregnancy Protocol were reviewed during an in-person or video presentation. Information regarding safe practices and radiation risk comparison were provided during the presentation. Comparative risks of other occupational and social habits with that of radiation received from occupational exposure were also reviewed and explained.

This signed form will be placed with the student's dosimeter report at the College.

RSO Signature: _____ Date: _____

I, _____ (print name), was present for the radiation safety overview and radiation pregnancy protocol review and know that I can contact the RSO or my program director if I have any further questions regarding radiation safety or the pregnancy policy.

In addition to the overview provided, I have reviewed and understand the entire Radiation Safety Manual, and specifically, the importance of exercising sound radiation safety practices at all times. I also understand that unsafe radiation practices are grounds for dismissal from my program of study.

I understand that according to the radiation pregnancy protocol, declaration of, and revocation of pregnancy must be in writing.

I have access to an ever-current, online version of the Radiation Safety Manual that contains the radiation safety and radiation pregnancy protocol.

I had an opportunity to ask questions and discuss any concerns related to radiation safety or the radiation pregnancy protocol during the review.

Please list any additional questions/concerns you may have, and the RSO will contact you through your program office (you may use the back of this page if additional space is needed):

Student's Signature: _____ Date: _____

NHS Radiation Monitoring Declaration of Pregnancy Form

TO: Program Director and/or Radiation Safety Officer
Pennsylvania College of Technology

In accordance with the U.S. NRC's regulations at [10 CFR 20.1208](#), "*Dose equivalent to an Embryo/Fetus*,"
I am declaring that I am pregnant. I believe I became pregnant in

_____.
(month/year)

I understand the radiation dose to my embryo/fetus during my entire pregnancy will not be allowed to exceed 500mRem or 5mSv (unless that dose has already been exceeded between the time of conception and submitting this letter). I understand that the fetal badge will be monitored monthly and that the dose cannot exceed 50mRem or 0.5mSv per month. I also understand that meeting the lower dose limit may require a change in job or job responsibilities during my pregnancy.

Student or Employee Signature

Date

Student or Employee Name (printed)

Program Director's Signature

Date Received

[NAME]
[ADDRESS]
[CITY, STATE ZIP]

Dear [NAME]:

Today, [DATE], you met with me to declare your pregnancy. Since you declared your pregnancy, I informed you of potential radiation risks and explained the program's Radiation Pregnancy Protocol to you. I also requested that you review the Radiation Safety Manual related to the College's Radiation Pregnancy Protocol, and see me if you have any further questions regarding this matter. As you may recall, I assured you that this would not change your status in your program of study. If at any point you wish to withdraw this declaration, you must do so in writing.

During our meeting, I informed you that you will be receiving a second dosimeter badge (fetal badge), which will be changed and monitored **monthly**. This badge should be worn **inside** the lead apron during fluoroscopy and mobile radiographic procedures. Your regular **quarterly** badge will monitor radiation exposure to you outside the lead apron, and the monthly fetal badge will monitor the exposure dose to the fetus under the lead apron. You have access to the NRC 8.13 and 8.29 documents that review radiation safety practices and risks. I will be happy to answer any questions that you or your physician may have regarding doses that you or your fetus receive. Please be reminded that the government restricts the fetus to 50mRem or 0.5mSv/month, for a total of 500mRem or 5mSv during the entire gestational period.

Recall, the U.S. NRC Regulatory Guidelines require coordination of exposure reports to ensure doses do not exceed the federal limits, including fetal limits as indicated above. Therefore, if you are currently badged or monitored for radiation exposure at another institution and declare your pregnancy at that facility, you must provide me with contact information for the radiation safety officer of that facility. Likewise, it is your responsibility to inform the radiation safety officer of the other facility that you are currently being badged by Penn College. They should, in turn, request your monthly fetal and quarterly personal exposure histories from Penn College for full coordination of exposure monitoring.

We recommend that you share this letter with your physician and discuss continuation in your program of study. We also recommend that your physician provide us with a letter indicating any restrictions or limitations that they deem necessary, or simply a statement stating that there are no limitations.

If you have any questions or concerns, please feel free to contact me or stop by my office to discuss them in person.

Sincerely,

Michael Covone, Ed.D., R.T.(R) (CT)
Associate Professor/Radiation Safety Officer

cc: Program Student File
Radiation Safety Officer

Voluntary Revocation of Pregnancy Declaration

From:

PCT ID:

Date:

Subject: Revocation of my former pregnancy declaration

To: Dr. Michael Covone, Radiation Safety Officer, Pennsylvania College of Technology

I am writing to formally revoke my previous pregnancy declaration. In accordance with NRC Regulatory Guide 8.13, I voluntarily withdraw my declaration, effective immediately.

I understand that this revocation means that any radiation exposure monitoring or limitations applied under the declared pregnancy status will no longer be in effect. Please update your records accordingly.

I understand that I can contact Dr. Covone or my program director with any questions.

Sincerely,

(signature must be signed via pen)

Please hand deliver the completed form to the NHS School Office in ATHS E257 or email it (using your Penn College email account) to mcovone@pct.edu and your program director.