STUDENT HANDBOOK

MEDICAL RADIOLOGIC TECHNOLOGY

COPIAH LINCOLN
COMMUNITY COLLEGE

Wesson Campus

2024-2025

COLLEGE ADMINISTRATION

President	Dewayne Middleton, Ph.D.
Vice President of Wesson Campus	Jackie Martin, Ed. S.
Dean of Career & Technical Education	Sharolyn Magee, Ed.D.

PROGRAM FACULTY

Radiography Program Director	Kelly Fenwick, M.H.S., R.T.(R)
Radiography Clinical Coordinator	Taylor Spring, B.H.S., R.T. (R)(T)
Radiography Didactic Instructor	Amanda Williams, B.S.R.S., R.T. (R)(CT)

CLINICAL EDUCATION CENTERS

Medical Centers	Clinical Instructor(s)
Merit Health Central 1850 Chadwick Drive Jackson, MS 39204 Phone: 601-376-1000	Christy Hasson, R.T. (R)
King's Daughters Medical Center PO Box 948 Brookhaven, MS 39601 Phone: 601-833-6011	Shelby Bandy, R.T. (R) Leila Jackson, R.T. (R)(CT)
Southwest MS Regional Medical Center PO Box 11307 McComb, MS 39648 Phone: 601-249-1730	Ashley Dunaway, R.T. (R)
Merit Health Natchez 54 Seargent S. Prentiss Drive Natchez, MS 39120 Phone: 601-443-2100	Shannon Longmire, R.T. (R)(CT)
VA Memorial Hospital 1500 East Woodrow Wilson Jackson, MS 39216 Phone: 601-362-4471 ext. 5556	Jason Hannis, R.T. (R)(MR)
St. Dominic/Jackson Memorial Hospital 969 Lakeland Drive Jackson, MS 39216 Phone: 601-200-6150/601-200-6157	Charla Edwards, R.T. (R) Teresa Smith, R.T. (R)
Capital Orthopedic 104 Burney Drive Flowood, MS 39232 Phone: 601-987-8200	Lucy Roark, R.T. (R)
Copiah County Medical Center 27190 Highway 28 Hazlehurst, MS 39083 Phone: 601-574-7132	Kacie Furlow, R.T. (R)(CT)

Franklin County Memorial Hospital 40 Union Church Road Meadville, MS 39653 Phone: 601-384-8116	Leah Smith, R.T. (R)(CT)

Fall Term 2024

August 12-16 (Mon.-Fri.) ..... Fall Convocation and Campus Faculty Meetings
August 15 (Thurs.) ..... Registration – All Campuses
August 19 (Mon.) ..... Classes Begin (CLIC A Begins)
September 2 (Mon.) ..... Labor Day Holiday
October 8 (Tues.) ..... CLIC A Ends
October 9 (Wed.) ..... CLIC B Begins
October 14-15 (Mon.-Tues.) ..... Fall Break
November 25-29 (Mon.-Fri.) ..... Thanksgiving Holidays
December 9-12 (Mon.-Thurs.) ..... Final Exams
December 13 (Fri.) ..... Final Grades Due to Admissions, 10:00 am
December 17 (Tues.) ..... December Graduation, Wesson Campus
December 17 (Tues.) ..... Christmas Holidays Begin at 4:00pm

Spring Term 2025

January 8 (Wed.) ..... ALL Employees Return to Work
January 9 (Thurs.) ..... Registration - All Campuses
January 13 (Mon.) ..... Classes Begin (CLIC A Begins)
January 20 (Mon.) ..... State/National Holiday
March 4 (Tues.) ..... CLIC A Ends
March 6 (Thurs.) ..... CLIC B Begins
March 10 – 14 (Mon.-Fri.) ..... Spring Break
April 18 – April 21 (Fri.-Mon.) ..... Easter Holiday
May 5 - 8 (Mon.-Thurs.) ..... Final Exams
May 9 (Fri.) ..... Final Grades Due to Admissions, 10:00 am
May 13 (Tues.) ..... Graduation - Wesson
May 14 (Wed.) ..... Graduation - Simpson County
May 15 (Thurs.) ..... Graduation - Natchez

Summer Term 2025

May 19 – May 30 ..... Maymester Term
May 19 – July 25 ..... Career Term
May 26 (Mon.) ..... Memorial Day Holiday
June 2 (Mon.) ..... Last Day to Register for First Term
June 2 - June 25 (exams on 6/25) ..... First Summer Term
July 3-4 (Thurs-Fri.) ..... July 4th Holiday
July 7 (Mon.) ..... Last Day to Register for Second Term
July 7 – July 30 (exams on 7/30) ..... Second Summer Term

TABLE OF CONTENTS

GENERAL

PROGRAM OVERVIEW

PROFESSIONAL/PROGRAM REQUIREMENTS

PROGRAM ADMISSION/SELECTION POLICIES

EXPENSES

STUDENT HEALTH

GRADING POLICY

GRADUATION AND PROFESSIONAL REQUIREMENTS

ATTENDANCE

GENERAL PROGRAM POLICIES

RADIATION SAFETY

EMERGENCY/GENERAL POLICIES AND REGULATIONS

GENERAL APPEALS AND COMPLAINTS

CLINICAL

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY
STUDENT HANDBOOK

GENERAL

WELCOME

The administration, faculty, and staff welcome you to the Medical Radiologic Technology (RGT) program. This student handbook will familiarize you with information relevant to your participation and ultimate success in the RGT program.

Additional information on services of Copiah-Lincoln Community College (Co-Lin) are located in the Co-Lin Catalog, the Copiah-Lincoln Community College Student Handbook and at www.colin.edu.

INTRODUCTION

This handbook is written to make the student aware of the policies and guidelines unique to the Radiography program and the clinical setting. The student must also observe college policies as stated in the college catalog and the Copiah-Lincoln Community College Student Handbook. Because of the seriousness of clinical assignments, some of the policies stated here are more stringent than overall college policies addressing the same subjects. In such cases, Radiography students are governed by the policies of this handbook.

The policies and procedures stated in this handbook represent a contractual agreement between Copiah-Lincoln Community College and the student for two years, or as long as the student remains enrolled in the Radiography program. Failure to comply with these policies and procedures will affect the student's evaluations and will result in dismissal from the program if the student shows no improvement or effort to correct errors after counseling. The Radiography program reserves the right to alter or change any statement or policy without prior notice. Students will receive revisions as they occur.

ACCREDITATION

Copiah-Lincoln Community College is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools.

The Medical Radiologic Technology program is accredited by the Joint Review Committee on Education in Radiologic Technology; 20 N. Upper Wacker Drive, Suite 2850, Chicago, IL 60606-3182; 312-704-5300; Fax: 312-704-5304; www.jrcert.org. **(Appendix A)**

NON-DISCRIMINATION STATEMENT

Copiah-Lincoln Community College does not discriminate on the basis of race, color, religion, national origin, sex, age, or disability in admission to its programs, services, or activities, in access to them, in treatment of individuals, or in any aspect of their operations. Copiah-Lincoln Community College Career and Technical Education department does not discriminate in enrollment or access to any of the programs available including business and computer, construction and manufacturing, engineering, health sciences, human sciences and transportation pathways. The lack of English language skills shall not be a barrier to admission or participation in the district's activities and programs. Copiah-Lincoln Community College also does not discriminate in its hiring or employment practices.

This notice is provided as required by Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and the Americans with Disabilities Act of 1990.

Questions, complaints, or requests in regard to Title IX directives should be made to the Title IX Coordinator/ Compliance Officer, Tiffany Perryman, Ewing Administration Building, 1001 Co-Lin Lane, Wesson, MS 39191, (601) 643-8411.

Questions, complaints, or requests in regard to Section 504 directives should be made to: Wesson Section 504 Coordinator, Amber Bowman, Henley Building, Lester R. Furr Dr., Wesson, MS 39191, (601) 643-8342; or Natchez Section 504 Coordinator, Rukiya Abston, Tom Reed Academic Building, 11 Co-Lin Circle, Natchez, MS 39120, (601) 446-1225 or Simpson Section 504 Coordinator, Nicole Cheramie, Sidney Parker Academic Building, 151 Co-Lin Dr., Mendenhall, MS 39114, (601) 849-0123

DISABILITY STATEMENT

If you are a student that has a disability which qualifies under the Americans with Disabilities Act (ADA) and requires accommodations, you should contact the Office of Disability Support Services at (601) 643-8342 or contact Amber Bowman in the Counseling Center.

PROGRAM OVERVIEW

PROGRAM MISSION STATEMENT

The mission of the Medical Radiologic Technology program is to educate and prepare students for employment in the field of diagnostic radiography. The program is committed to providing quality instruction that provides a foundation for continuing education or advancement in the field of radiography while promoting high ethical standards in a safe, student-centered environment.

Program Goals

1. Students will demonstrate clinical competence with respect to program level.
2. Students will demonstrate effective communication skills.
3. Students will demonstrate effective critical thinking and problem solving skills.
4. Students will demonstrate professionalism.
5. Students will graduate with professional competence that meets the needs of the community.

Student Learning Outcomes

The Medical Radiologic Technology program provides educational experiences to ensure student competency.

1. Students will demonstrate retention of knowledge on exam competencies.
2. Students will be able to make procedural adjustments for exams.
3. Students will practice appropriate radiation safety measures.
4. Students will demonstrate effective written communication skills.
5. Students will demonstrate effective oral communication skills.
6. Students will evaluate images for appropriate positioning and image quality.
7. Students will apply imaging principles to adjust technical factors.
8. Students will apply digital imaging principles.
9. Students will demonstrate knowledge of professional organizations.
10. Students will demonstrate ethical behavior.

MEDICAL RADIOLOGIC TECHNOLOGY CURRICULUM

Summer Term	***Semester Hours***
BIO 2513 Anatomy & Physiology I	3
BIO 2511 Anatomy & Physiology I Lab	1
BIO 2523 Anatomy & Physiology II	3
BIO 2521 Anatomy & Physiology II Lab	1
ENG 1113 English Composition I	3
	11

Freshman Year

Fall Semester	***Semester Hours***
RGT 1114 Clinical Education I	4
RGT 1212 Fundamentals of Radiography	2
RGT 1312 Principles of Radiation Protection	2
RGT 1323 Principles of Exposure & Image Prod.	3
RGT 1513 Radiographic Procedures I	3
MAT 1313 College Algebra	3
	17

Spring Semester	***Semester Hours***
RGT 1124 Clinical Education II	4
RGT 1223 Patient Care in Radiography	3
RGT 1333 Digital Image Acquisition Display	3
RGT 1523 Radiographic Procedures II	3
SPT 1113 Public Speaking	3
	16

Summer Term	
RGT 1139 Clinical Education III	9
	9

Sophomore Year

Fall Semester	***Semester Hours***
RGT 1613 Physics of Imaging Equipment	3
RGT 2147 Clinical Education IV	7
RGT 2533 Radiographic Proc. III	3
RGT 2922 Radiographic Pathology	2
Approved Social/Beh. Science Elective	3
	18

Spring Semester	***Semester Hours***
RGT 2132 Ethical and Legal Responsibilities	2
RGT 2157 Clinical Ed. V	7
RGT 2542 Radiographic Proc. IV	2
RGT 2912 Radiation Biology	2
RGT 2932 Certification Fundamentals	2
Approved Humanities/Fine Arts Elective	3
	18

Required Social Science Elective – one of three (3) semester hour courses listed below:

PSY 1513 General Psychology I
SOC 2113 Intro to Sociology
PSY 1113 American National Government
PSY 2533 Psychology of Personal Adjustment

Required Humanities/Fine Arts Elective – one of the three (3) semester hour courses listed below:

ART 1113 Art Appreciation
MUS 1113 Music Appreciation
HIS 1163 World Civilization I
HIS 1173 World Civilization II
HIS 2213 American History I or
HIS 2223 American History II
ENG 2223 American Literature I or
ENG 2233 American Literature II
ENG 2323 English Literature I or
ENG 2333 English Literature II
ENG 2423 World Literature I or
ENG 2433 World Literature II
ENG 2513 African American Literature I or
ENG 2523 African American Literature II

REQUIRED STUDENT COMPETENCIES

Clinical Education (RGT 1114, 1124, 1139, 2147, 2157)

1. Apply radiologic principles in the clinical setting with respect to program level.
2. Perform clinical application skills for radiographic procedures.
3. Demonstrate tasks associated with radiographic procedures.
4. Practice radiation safety.

Fundamentals of Radiography (RGT 1212)

1. Describe the role, organization, and structure of the program, radiology department, hospital, and profession.
2. Discuss ethical issues and dilemmas in health care.
3. Translate medical terms, abbreviations, and symbols into common language.

Patient Care and Radiography (RGT 1223)

1. Employ interpersonal skills to alleviate patient fears and promote a professional environment.
2. Employ general environmental safety precautions.
3. Evaluate physical needs.
4. Describe infection control precautions.
5. Recognize and employ appropriate responses to acute situations and medical emergencies.
6. Respond to patient needs in special situations.

Principles of Radiation Protection (RGT 1312)

1. Examine concepts involved in an effective radiation protection program.
2. Discuss the methods of detection and measurement of ionizing radiation.
3. Review radiation surveys and regulatory agency regulations.
4. Identify occupational exposure limits and methods of personnel monitoring.

5. Analyze components of an effective patient protection program.
6. Utilize concepts of practical radiation protection.

Principles of Exposure & Image Production (RGT 1323)

1. Analyze exposure factors to achieve optimum radiographic quality.
2. Determine exposure factors to achieve optimum radiographic density with a minimum radiation exposure to the patient.
3. Determine exposure factors to achieve optimum radiographic contrast with a minimum radiation exposure to the patient.
4. Determine exposure factors to achieve optimum radiographic detail with a minimum radiation exposure to the patient.
5. Determine exposure factors to achieve appropriate radiographic distortion with a minimum radiation exposure to the patient.
6. Determine exposure factors to achieve optimum exposure latitude with a minimum of radiation exposure to the patient.
7. Use x-ray beam restrictors for radiation protection and optimal radiographic quality.
8. Use x-ray beam filtration for radiation protection and optimal radiographic quality.
9. Recognize the effects of scattered and secondary radiation on the radiographic image and patient dosage.
10. Utilize devices to control exit radiation.
11. Utilize various imaging systems with consideration for radiation protection and radiographic quality.
12. Perform mathematical calculations and measurement conversions used in Radiologic Technology.
13. Describe processing area, film, storage, and handling considerations.
14. Describe characteristics of films utilized in radiographic procedures.
15. Evaluate the use of film holders and intensifying screens.
16. Assess the automatic processor systems, functions, and maintenance.
17. Evaluate artifacts processing.
18. Discuss the principles of silver recovery.

Digital Image Acquisition Display (RGT 1323)

1. Discuss the fundamentals of digital radiography, distinguishing between cassette-based systems and cassette-less systems.
2. Compare the image acquisition and extraction of cassette-based vs. cassette-less systems, including detector mechanism, initial image processing, histogram analysis, automatic rescaling and exposure index determination.
3. Describe the difference between dose area product (DAP) measured with a flat panel system vs. the exposure index for a PSP-based system.
4. Associate effects of inappropriate processing on image clarity on conspicuity.
5. Define digital imaging and communications in medicine (DICOM).
6. Examine the potential impact of digital radiographic systems on patient exposure and methods of
7. practicing the as low as reasonably achievable (ALARA) concept with digital systems.

Physics of Imaging Equipment (RGT 1613)

1. Describe x-ray production and identify properties of x-rays as related to exposure and measurement of radiation.
2. Utilized diagnostic imaging equipment.
3. Describe the components of the CT imaging system.
4. Differentiate among quality improvement and management, quality assurance, and quality control.

Radiographic Procedures I (RGT 1513)

1. Identify basic radiographic positioning skills.

2. Discuss general procedural considerations for radiographic examinations.
3. Identify positioning considerations for routine radiographic procedures.
4. Identify positioning considerations for routine contrast studies.
5. Identify procedural considerations for special studies.
6. Identify positioning considerations for mobile and trauma radiography for those areas of the body included in this course.

Radiographic Procedures II (RGT 1523)

1. Identify positioning considerations for routine radiographic procedures.
2. Identify positioning considerations for mobile and trauma radiography for those areas of the body included in this course.
3. Demonstrate the drug administration procedure.

Radiographic Procedures III (RGT 2533)

1. Identify positioning considerations for routines skull procedures.
2. Identify procedural considerations for special views of the face and cranium.

Radiographic Procedure IV (RGT 2542)

1. Identify procedural considerations for special routine radiographic studies.
2. Identify procedural considerations for special radiographic studies.
3. Identify various types of drugs and interactions.
4. Identify and describe diagnostic contrast agents.
5. Identify procedural considerations for the reproductive system.
6. Identify procedural considerations for special routine radiographic studies.

Ethical and Legal Responsibilities (RGT 2132)

1. Apply medical and professional ethics in the context of a broader society.
2. Discuss the appropriate physical boundaries in relation to touching with no formal consent.
3. Identify legal/professional standards and their relationship to practice in health professions.

Radiation Biology (RGT 2912)

1. Evaluate biophysical events relating to radiation exposure.
2. Analyze radiation effects on living organisms.
3. Demonstrate comprehension of radio sensitivity and response.
4. Discuss the US Genome Project as it relates to the causes of contribution to genetically induced disease.

Radiographic Pathology (RGT 2922)

1. Identify terms and conditions related to pathology.
2. Relate radiographic diagnosis to the classification of trauma/physical injury.
3. Explain classification and radiographic demonstration of systematic disease.
4. Discuss damage and repair of tissue.

Certification Fundamentals (RGT 2932)

1. Recall radiation protection standards.
2. Identify equipment operation and maintenance practices.
3. Summarize image production and evaluation.
4. Summarize the routine radiographic procedures.
5. Identify all aspects of patient care.

ESSENTIAL FUNCTIONS FOR MEDICAL RADIOLOGIC TECHNOLOGISTS

The following Essential Functions provide descriptions of basic cognitive, sensory, affective, and psychomotor domains for successful Medical Radiologic Technology program completion.

Essential Visual Functions

1. Visual acuity to discern radiographic details on a radiographic image.
2. Observe clinical and laboratory demonstrations of patients being x-rayed for pathologic conditions.
3. Read and comprehend text, numbers, and graphs displayed in print and on a computer monitor.

Essential Movement Requirements

1. Ability to assist, lift, or move immobile patients.
2. Maneuver stationary and mobile radiology equipment while safely performing x-rays on patients.
3. Ability to stand or walk for long periods of time.

Essential Communication Requirements

1. Read and comprehend technical and professional materials.
2. Follow verbal and written instructions in order to correctly and independently perform radiology procedures.
3. Clearly instruct patients prior to x-ray procedures.
4. Effectively converse with patients regarding radiology procedures.
5. Communicate with faculty members, fellow students, staff, and other health care professionals verbally and in a recorded format.

Essential Behavioral Requirements

1. Manage the use of time and be able to systematize actions in order to complete professional and technical tasks with realistic constraints.
2. Possess the emotional stability necessary to effectively employ intellect and exercise appropriate judgment.
3. Provide professional and technical services while experiencing the stresses of task-related uncertainty and a distracting environment.
4. Be flexible and creative and adapt to professional and technical change.
5. Recognize potentially hazardous materials, equipment, and situations and proceed safely in order to minimize risk of injury to patients, self, and nearby individuals.
6. Adapt to working with unpleasant orders.
7. Support and promote the activities of fellow students and of health care professionals. Promotion of peers help furnish a team approach to learning, task completion, problem-solving and patient care.
8. Be honest, compassionate, ethical and responsible.

The student must be forthright about errors or uncertainty. The student must be able to critically evaluate his/her own performance, accept constructive criticism, and look for ways to improve.

RADIOLOGIC TECHNOLOGY CODE OF ETHICS

The Code of Ethics forms the first part of the Standards of Ethics. The Code of Ethics shall serve as a guide by which Certificate Holders and Candidates may evaluate their professional conduct as it relates to patients, healthcare consumers, employers, colleagues, and other members of the healthcare team. The Code of Ethics is intended to assist Certificate Holders and Candidates in maintaining a high level of ethical conduct and in providing for the protection, safety, and comfort of patients. The Code of Ethics is aspirational.

1. The radiologic technologist acts in a professional manner, responds to patient needs, and supports colleagues and associates in providing quality patient care.
2. The radiologic technologist acts to advance the principal objective of the profession to provide services to humanity with full respect for the dignity of mankind.
3. The radiologic technologist delivers patient care and service unrestricted by the concerns of personal attributes or the nature of the disease or illness, and without discrimination on the basis of sex, race, creed, religion, or socio-economic status.
4. The radiologic technologist practices technology founded upon theoretical knowledge and concepts, uses equipment and accessories consistent with the purposes for which they were designed, and employs procedures and techniques appropriately.
5. The radiologic technologist assesses situations; exercises care, discretion, and judgment; assumes responsibility for professional decisions; and acts in the best interest of the patient.
6. The radiologic technologist acts as an agent through observation and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
7. The radiologic technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice, and demonstrates expertise in minimizing radiation exposure to the patient, self, and other members of the healthcare team.
8. The radiologic technologist practices ethical conduct appropriate to the profession and protects the patient's right to quality radiologic technology care.
9. The radiologic technologist respects confidences entrusted in the course of professional practice, respects the patient's right to privacy, and reveals confidential information only as required by law or to protect the welfare of the individual or the community.
10. The radiologic technologist continually strives to improve knowledge and skills by participating in continuing education and professional activities, sharing knowledge with colleagues, and investigating new aspects of professional practice.
11. The radiologic technologist refrains from the use of illegal drugs and/or any legally controlled substances which result in impairment of professional judgment and/or ability to practice radiologic technology with reasonable skill and safety to patients.

ADMISSION/SELECTION POLICIES

PROGRAM ADMISSION REQUIREMENTS

The program enrollment is limited to twenty (20) new students each year. In addition to meeting college admission requirements, students are responsible for completing the items below in order to be considered for enrollment.

The applicant must:

1. Be **18** years of age upon entrance into the program.
2. Complete and return a Radiologic Technology Application to the **Radiography Program** by **February 1.** The application can be found online on our website at www.colin.edu/programs-of-study/career-technical/health-sciences/medical-radiologic-technology
3. Complete the college application and return to the **College Admissions Office by February 1** unless a current Co-Lin student.
4. Provide evidence of high school graduation or equivalent to the College Admission Office by **February 1.**
5. Have official college transcripts of all other college (other than Copiah-Lincoln Community College work) sent to the College Admission Office by **February 1**.
6. Have ACT score on file in the College Admission Office by **February 1**.
7. A minimum of an enhanced ACT score of 18 is required.

8. All **academic courses in the Radiography curriculum must be completed with a grade of "C" or better in each course prior to beginning the program. Students who apply will need to be in good standing by the time classes start in the Fall.** **(Not on academic probation)** In addition, completion of any developmental courses that are indicated by ACT sub-scores is required prior to entrance into the program.
9. Have two letters of recommendation on file in the Radiography program by **February 1.** These forms can also be found on our website.
10. Watch the RGT program tour video online and complete the corresponding quiz with at least 80% accuracy.

Acceptance will be based on:

- completed RGT Application Packet
- ACT score
- GPA
- Interview

If accepted, all applicants must participate in drug and alcohol testing, criminal history background check, and attend a clinical orientation when school starts. The Medical Radiologic Technology curriculum includes specific radiography (RGT) courses and seven academic courses. (See page 2) **Students are required to have a "C" average in all course work.** Students completing the academic courses prior to being selected into the program is at an advantage because bonus points are given for completion of Radiography curriculum academics completed with an "A" or "B" and used in the selection process.

CRIMINAL BACKGROUND INFORMATION

According to the Mississippi State Law, an individual may not be eligible for employment in a health care agency if the criminal history record check discloses a felony conviction, guilty plea or plea of nolo contendere to a felony of possession or sale of drugs, murder, manslaughter, armed robbery, rape, sexual battery, sex offense listed in Section 45-33-23 (f), child abuse, arson, grand larceny, burglary, gratification of lust or aggravated assault, or felonious abuse and/or battery of a vulnerable adult that has not been reversed on appeal or for which a pardon has not been granted.

Medical Radiologic Technology students are required to participate in a criminal background check **after acceptance** into the RGT program. All charges or convictions **must** be reported to the Radiography program in order for students to be cleared to take registry. The certifying agency for Radiologic Technologist (ARRT) requires reporting of all charges except minor traffic citations and convictions processed in juvenile court.

Once accepted into the program, it is the student's responsibility to immediately notify the RGT department in writing of any subsequent changes in criminal history that occur after the Criminal Background Check has been completed. Failure to do so may result in immediate withdrawal from the program.

Students assigned to certain clinical affiliates may also be required to have **additional criminal background checks to comply with specific clinical affiliation guidelines.**

Students must be able to attend clinical affiliation sites in order to meet the requirements of the RGT Program. If a student is found to be ineligible for clinical placement any time during the program, the student is unable to meet clinical learning objectives and will be withdrawn pending resolution of the situation.

Students must give Copiah-Lincoln Community College written permission in program to conduct background checks with the Mississippi Department of Public Safety, Federal Bureau of Investigation, and any other persons to determine their suitability in working in Health Occupations. Criminal background checks will be performed after entrance into the program, but prior to clinical placement.

Falsification of any information on this application will constitute grounds for non-acceptance into this program or dismissal from the program if applicant has been accepted.

RADIOGRAPHY STUDENT SELECTION PROCESS

Radiography program enrollment is limited to twenty (20) first year students. The process of screening applicants for enrollment is described below. The data is put in an excel spread sheet and ranked using a mathematical formula. The applicant is responsible for sending application, transcripts and ACT score to the program by the advertised deadlines.

1. Minimum ACT score: The program requires a minimum enhanced ACT score of 18.
2. Students are selected based on the following criteria:

    a) ACT

    b) GPA (4.0 grading scale):

    c) Interview: The criteria stated above is used to pre-screen and select the top applicants for interview by the selection committee. Each member of the committee rates each applicant using a standard rating sheet with a maximum score of thirty-five (35). These ratings are averaged for each applicant and used in the selection process.

    d) The students with the highest ratings and who meet program qualifications will be accepted into the program with the next four applicants recommended as alternates and are accepted if a vacancy occurs. Alternate status is good for only one semester.

    e) Bonus Points: Bonus points are added for academic courses in the Radiography curriculum completed with grades of "A" or "B". Two bonus points will be given for completion of each of the following courses with an "A" and one bonus points for completion with a "B."

        - BIO 2513 Anatomy & Physiology I (with completion of lab)
        - BIO 2523 Anatomy & Physiology II (with completion of lab)
        - ENG 1113 English Composition
        - SPT 1113 Public Speaking
        - Humanities Elective
        - Fine Arts Elective
        - MAT 1313 College Algebra

3. Applicants are notified by letter of acceptance, conditional acceptance, alternate letter, or non- acceptance within three weeks of the interview.
4. Applicants who are conditionally accepted must comply with all terms outlined in the conditional acceptance letter within the time frame stated.
5. The student selection committee will consist of college officials and clinical affiliate representatives available.

RE-ADMITTANCE POLICY

If for any reason the student is unable to continue with the program as scheduled, he/she may later apply for reentrance at the level of the last semester successfully completed. If a student re-enters the program, graduation requirements must be met within three years of initial program entrance date in order to qualify to

take the ARRT examination. Students with two failed attempts from any Radiography Program are not qualified for re-admittance.

For Re-admittance, a letter to the Radiography Selection Committee is required with submission of the application. It should include reasons for withdrawal and why applicant wants to re-enter the program.

If accepted for reentrance into the program the student must complete and submit a Health Occupation Application Form at least six weeks prior to the semester of enrollment.

Re-admittance into the program is NOT guaranteed. Re-admittance by the selection committee will be based on the number of qualified applicants and reasons for failure.

TRANSFER STUDENT FROM ANOTHER RGT PROGRAM

The acceptance of transfer students into the RGT Program is based upon the following:

1. Completion of RGT Application packet and Co-Lin Application by June 1 for fall semester and Nov 1 for the spring semester.
2. Space available in RGT Program.
3. Evaluation of the applicant's college transcript, course material descriptions, and competencies including:
   - Appropriate grades (C or better) in all course work being considered for transfer
   - Comparable content and semester hours in courses being considered for transfer
   - ACT of 18 recommended
4. RGT transfer courses must have been completed no more than 1 year prior to acceptance into the Co-Lin RGT program.
5. Letter of good standing from program director of the transferring program.
6. Ability to meet all Co-Lin requirements for graduation.
7. If admitted, applicant will provide documentation that all clinical/program requirements have been met (CPR certification, criminal background check, health forms).

EXPENSES

General Expense

Expenses Each Semester	Mississippi Student	Out-of-State Student
Tuition	$1,850.00	$1,850.00
Out-of-State Tuition	N/A	$1,000.00
Technology Fee	$150.00	$150.00
Student Service Fee	$150.00	$150.00
Residence Hall Reservation Fee (per application)	$75.00	$75.00
Residence Hall Fee*	$1100.00	$1100.00
Residence Hall Fee (Bates Hall & Nettles Hall)*	$1200.00	$1200.00
Residence Hall Meal Plan (Wesson)	$1500.00	$1500.00
Commuter Meal Plan	$500.00	$500.00
Vehicle Registration (Yearly)	$30.00	$30.00
Lab fee (Healthcare)	$75.00	$75.00

*All dormitory students are required to purchase a meal plan.

Part-time Mississippi resident students (students enrolled in less than 12 hours) are assessed tuition fees of $185.00 per semester hour. Out-of-State part-time students are assessed fees of $285.00 per semester hour. Students taking hours in excess of 18 hours, will be charged $185 per semester hours.

ALL FEES ARE PAYABLE UPON REGISTRATION. Scholarships, student loans and other financial aid must be completely processed by the Financial Aid Office to qualify for offset of fees. Fees are subject to change.

Textbooks: All students are expected to own a text for each course. The cost of books varies in different fields of study. All hardbound textbooks which are in good condition and are on the adopted textbook list for the following year will be bought back from students. Books may be sold back to the bookstore during exam week only.

Radiography Program Expenses

Estimated Expenses	All Students
Book Cost 1st Semester	$800.00
Book Cost Each Remaining Semester	$150.00
Software	$150.00
Liability Insurance Per Year	$80.00
CPR (to be scheduled)	$50.00
Uniforms	$100.00
Uniform Emblem	$6.00
Shoes	$60.00
Anatomical Markers (1st semester)	$30.00
Criminal History Background Check	$50.00
Drug Testing	$30.00
Dosimeter Fee	$75.00
MSRT Membership Per Year	$10.00
Registry application – last semester	$250.00
Graduation (walking only) fee – last semester	$40.00

PRINTING POLICY- See Student Handbook

INSURANCE

The student is required to purchase professional liability insurance through the Co-Lin Business Office. The clinical coordinator will distribute information on insurance.

Neither Co-Lin nor clinical affiliate will be responsible for medical expenses incurred by the student as a result of illness or injury while on clinical assignment or on campus. It is strongly recommended that students carry hospitalization insurance. Information on hospitalization insurance policies can be obtained through student services on campus.

REFUND POLICY

No refund for tuition and fees will be given to students who are accepted into programs which have a limited number of student slots and where acceptance into those slots is highly competitive. Those programs include: (CLCC Student Handbook)

- **Associate Degree Nursing**
- **Medical Lab Technology**
- **Medical Radiologic Technology**

- **Practical Nursing**
- **Respiratory Care Technology**
- **EMT Paramedic Technology**

TRANSPORTATION

The student is responsible for transportation to clinical assignments. Students able to car-pool or share a ride with other students or hospital employees will be expected to contribute his/her share.

STUDENT HEALTH

PHYSICAL EXAMINATION

In addition to immunization records required by the college the student must have a physical examination which includes:

- Health Occupations Health Examination Report which is completed and signed by a physician.
- Tuberculosis skin test results- 2 step
- Chest x-ray if TB test is positive
- Hepatitis B vaccine or a signed declination statement
- Two MMR's
- One Rubeola
- Varicella – documentation of titer or vaccination
- One Tdap

REPORTING HEALTH CONDITIONS

Illness/Communicable Disease

Students are to report any illness, communicable diseases or changes in his/her health condition to the clinical coordinator and/or program director immediately. Students will not be allowed to remain in the clinical setting if these conditions might adversely affect his/her well- being or the health and well-being of other students, patients or staff.

COVID 19 Exposure

If COVID 19 exposure should occur the student must report this to Co-Lin Instructors and Clinical Instructors. Guidelines as set forth by the MS State Department of Health will be followed.

Doctors Release

In cases of serious illness or injury a doctor's release will be required prior to returning to class or the clinical setting. Arrangements will be made for the student to make up clinical time missed because of illness or injury.

HIV/AIDS

Students diagnosed as being HIV positive including AIDS-Related Complex (ARC) or Acquired Immune Deficiency Syndrome will be allowed to carry out their normal school functions. Exceptions to this would be individuals who have skin eruptions or weeping lesions that cannot be covered and therefore are at risk of giving or getting an infection; any other unusual factors that would affect school performance; or individuals who are too ill to assume their usual student responsibilities.

Any knowledge on the part of Copiah-Lincoln Community College regarding a student's diagnosis of AIDS or ARC will be kept as confidential as reasonable under the circumstances. Knowledge of diagnosis or health status should not be shared with persons or entities except as necessary and as provided for in state and/or federal statutory law or by court order.

As with any other prolonged or special medical condition, a student with AIDS or ARC is expected to inform his/her teacher if his/her health status will prevent regular and reliable work attendance or performance. Existing absentee policies and procedures will govern these circumstances. It is hoped that a student with AIDS or ARC can inform the teacher in a timely manner and can feel secure in the college's assurance of confidentiality.

Since there is no evidence of casual transmission of AIDS, requests for transfer to avoid student, teacher or staff member with AIDS or ARC should not be granted except when special circumstances exist.

TB POLICY

A two-step TB skin test must be done prior to entrance into the program followed by a one-step TB skin test annually. If a student is exposed to TB, he/she should follow hospital protocol and provide documentation to Copiah-Lincoln Radiography Instructors.

The Mississippi Department of Health recommends an annual pulmonary history for all students that have a previous positive Mantoux Tuberculin Skin Test (TST) to determine the presence of tuberculosis symptoms. The Medical Radiologic Technology program would like to be certain that all radiology students are free of the disease for their own and the patient's health and safety and will be required to answer a Student Health Pulmonary History questionnaire. (See Attachment A)

HEPATITIS B POLICY

Copiah-Lincoln Community College seeks to provide protection of students and instructors in all situations. The Hepatitis B Policy was adopted to help ensure the safety of all involved in health occupations.

The Radiography student is strongly urged to begin the Hepatitis B Vaccination series upon acceptance into the Radiography Program.

Students may elect to take the Hepatitis B Vaccine or decline the vaccine. Each individual must sign the Hepatitis B Vaccine Consent Form indicating his/her vaccination decision. **(See Attachment A)**

ALCOHOL AND DRUG POLICY

The use of alcohol and drugs are prohibited. Random drug testing will be administered at the student's expense. Positive results are grounds for immediate dismissal from the RGT program.

PREGNANCY POLICY

If a student or faculty member is or becomes pregnant, the choice whether to declare her pregnancy is completely voluntary. If she chooses to declare her pregnancy, the declaration can be made to the Radiation Safety Officer (RSO) or a Radiography program faculty member. Any declaration must be in writing and must include estimated date of conception (month and year) and the declaration date. There is a form letter at the end of Appendix B which may be used for this purpose. If the student opts not to use this form, they can use their own letter. Any student who makes a written declaration of pregnancy will be counseled by the RSO or a faculty member. After counseling, the student may select one of the following options.

1. Continue in the program without modification of clinical assignment. In this case the student will be provided a dosimeter to be worn at waist level under the lead apron to record the fetal dose equivalent. See does limits below.
2. Continue in the program with modification of clinical assignment. If the student modifies clinical the student must complete missed assignments after medical release.
3. Take a leave of absence with guaranteed re-admittance at the level of withdrawal. If the student elects to delay clinical education, arrangements will be made for completion of the program at the end of the pregnancy, provided she meets all other program requirements and has a medical release.

The embryo/fetal dose equivalent must remain below the limits set by NCRP in order for the student to continue clinical education. The NCRP limits are 0.5 rem (5 millisievert) for the entire pregnancy and/or 0.05 rem (0.5 mSv) per month.

A declaration of pregnancy remains in effect until it is withdrawn in writing. A written declaration of pregnancy may be considered expired after one year.

The student is required to provide a medical release to program instructors when returning to school after parturition.

If the student elects not to disclose her pregnancy in writing, the college assumes no responsibility for radiation monitoring of the embryo/fetus or additional radiation safety counseling. The student and her embryo/fetus will be subject to the same radiation dose limits as other students. **(Appendix B)**

ACCIDENTS

If a student is involved in any activity which results in injury or potential injury to a patient, hospital employee, student or damage to equipment, this is to be reported to the Clinical Instructor or supervising technologist immediately. If it is necessary to file an accident report, a copy of this report must be sent to the Program Director. If hospital policy prevents duplication of the hospital report, the Copiah-Lincoln Community College Radiography Program Incident Report must be completed and returned to the Program Director.
(See Attachment C)

GRADING POLICY

It is the policy of Copiah-Lincoln Community college to allow each instructor to set his/her own grading system. Due to the score required to pass the American Registry of Radiologic Technologists and the critical nature of radiography work, high standards will be expected of the student. The student must complete all courses in the Radiography curriculum with a minimum of a "C" average.

RGT CLASSROOM GRADING SCALE

The method of grade calculation for didactic courses is located in each course syllabus. Students will be provided a course syllabus in the beginning of the course and a copy of the syllabus will be located on Canvas for future reference.

All RGT Courses except Certification Fundamentals

94% and above	A
87-93	B
80-86	C
Below 80	F

Certification Fundamentals RGT 2932

90 -100	A
80-89	B
70-79	C
69 and below	F

RGT CLINICAL GRADING SCALE

The method of grade calculation for all clinical courses is located in the clinical syllabus. The clinical syllabus is located in the Student Clinical Handbook provided each semester.

Clinical I-V

94% and above	A
87-93	B
80-86	C
Below 80	F

ACADEMIC COURSE GRADING SCALE

Students will be assigned a letter grade in each general education course based on the grading policy of the individual instructor.

REMEDIAL POLICY

To ensure competency of individual course units and success in the Medical Radiologic Technology program, instructors will review each unit test with the students and go over questions missed by 50% or more. The missed questions will be placed on subsequent unit tests to ensure the material has been reenforced. Students will also be offered counseling and tutoring if needed. The original unit test grade will still count as a test grade.

PROGRAM FAILURE POLICY

Students must receive a minimum grade of a "C" in all RGT courses to remain in the program. If the student should fail any Clinical or didactic Radiography (RGT) course, he/she will not be allowed to continue into the next semester.

The student may apply for readmission to the program at the level at which the course was failed. If re-admitted, the student will be required to repeat all didactic and clinical radiography courses in that semester.

Students are not guaranteed re-admittance when re-applying to the program. Several factors will be considered when re-applying, such as, number of courses failed, reasons for failure, clinical performance, and work ethic.

Students with two failed attempts from any Radiography program are not qualified for re-admittance. Breach of clinical/hospital policies resulting in a clinical site refusing admittance of a student for clinical assignment is grounds for dismissal from the program.

GRADUATION AND PROFESSIONAL REQUIREMENTS

GRADUATION REQUIREMENTS

All courses in the Radiography curriculum must be successfully completed with a "C" or higher prior to graduation or writing the American Registry of Radiologic Technologists (ARRT) exam. The time-frame for completion of RGT courses is three years from the initial start date.

ARRT EXAM

The American Registry of Radiologic Technologists (ARRT) is the only examining and certifying body for radiographers in the United States. To become a Registered Technologist in Radiography the student will have to successfully complete the ARRT examination.

Applications for examination will be provided to the student approximately two-three months prior to graduation. The cost of the examination for the student is $250.00.

Students/graduates make appointments to take the examination at their convenience. It is recommended that students take the examination immediately or within two months of graduation.

All RGT courses, including clinical make-up time must be complete before taking the examination.

MISSISSIPPI PROFESSIONAL LICENSURE

According to MS code Title 41 Chapter 58-3 students of an accredited Radiologic Technology are exempt from state licensure and may work under the supervision of a qualified technologist.

After graduation from an accredited program the MS code allows the State Department of Health to issue a temporary state license to practice in radiography. The temporary MS license is valid for one (1) six-month period. The graduate needs to apply for a permanent state license after successful completion the ARRT exam. If the ARRT exam is not successfully passed within this time frame the temporary license will be expired.

The department may charge a registration fee of not more than Fifty Dollars ($50.00) biennially to each person to whom it issues a registration under the provisions of 41 of the MS code.

The MS Department of Health states that "it is illegal to practice Medical Radiation Technology in Mississippi without being registered or exempted by statute or regulations. Individuals engaging in such practices, or employing non-registered practitioners, will be subject to criminal and/or civil penalties."
www.msdh.state.ms.us/

ATTENDANCE

SEMESTER BREAKS AND HOLIDAYS

Radiography students will be allowed to observe the same holidays and breaks between semesters as other Co-Lin students.

OFFICIAL ABSENCES FROM CLASS

Those absences caused by a student representing the college for an approved function are official absences. The number of these allowable absences will not count against total "allowable" absences; however, the number of official absences will be limited for each class.

CLASS AND LABORATORY ATTENDANCE

Regular class attendance is very important to college success; therefore, students are expected to attend class unless it is absolutely necessary to be absent. In the event it is necessary for a student to be absent, the student **MUST** notify the instructor through canvas with an explanation prior to the absence. Students **are expected to** make up all missed assignments on the first day of return to class unless prior arrangements are made and approved. Students are expected to make up all work missed due to absences. To protect the integrity of the test, make-up test will differ from regular tests and the maximum obtainable score will be 95%. Students failing to follow the make-up procedure for missed tests and assignments will receive a "0."

Each instructor will be responsible for explaining the attendance policy to students at the beginning of the semester. It is the student's responsibility to keep up with their number of absences.

Absences

The cut-out point in Career-Technical courses is as follows:

Number of Class Meetings Per Week	Cut-out Point
One	2
Two	2
Three	3
Four	4
Five	5
Six	6

A class meeting is defined as time scheduled on the official semester class schedule. A class may have more than one (1) meeting scheduled per day.

Tardies

A tardy will be defined as missing up to 10 minutes of a class. Two tardies will constitute one absence. A student is counted absent if the student misses more than 10 minutes of class. Career-Technical students who are absent or tardy more than 10 minutes from a daily lab period will be counted absent for that lab period. A student who is tardy must notify the instructor of their presence in class at the end of the class. The only exception is for Ethics. In this class, every minute counts. After 1 minute, you are considered tardy.

Leaving before Class Conclusion

Students are expected to remain in the class and be attentive until the instructor indicates that the class session is over. Compelling personal needs may force students to leave the room during class. Whenever possible, students should inform instructors prior to the start of class of any personal difficulties that might lead them to leave the room during class. Students who leave the room should make every effort to leave and return with as little disruption as possible. Habitual and unexcused movement during class sessions may be prohibited by the instructor, unless extenuating circumstances supported by doctor's orders.

CLINICAL ATTENDANCE

Students are responsible for clocking in and out each day using "clinical attendance" in Trajecsys clinical software system. Students will clock in and out of the Trajecsys time clock from a computer within the department. Students are NOT allowed to clock in and out on their personal cellular devices. Failure to clock in and out will result in a make-up day of clinical. No student may clock in or out for another student.

Falsification of Clinical Attendance

Falsification of clinical time will NOT be tolerated. This is a very serious offense and is grounds for dismissal from the program. Falsification of clinical time is considered, but not limited to situations such as clocking in for other students, failing to clock in or out and claiming to be present. The clinical components comprise a very large portion of the students learning activities. Attendance, punctuality, and the student's diligence in participating with patient examinations are key factors to the successful completion of this program as well as securing employment.

Breaks during Clinical Hours

Students are allowed 30 minutes for lunch and a 15-minute break in the morning and 15-minutes in the afternoon. Breaks are allowed only as patient load permits. Students should ask supervising technologist before leaving the assigned area. Students should sign in and out for lunch. The times must be verified by a tech.

Tardies

Students will be considered late if they are not in the Radiography Department within five minutes of the scheduled arrival time. Four tardies will constitute one absence and is required to be made up.

Reporting Tardies and Absences

If unavoidable circumstances result in tardiness or absence, the student must call the clinical instructor or supervisor at the clinical facility as early as possible, but not later than fifteen minutes before the scheduled reporting time. Failure to notify the clinical instructor of an absence will result in a "write up" under the discipline policy and a "10-point deduction" on the student's next evaluation. All instructors at Co-Lin should be notified through canvas in cases of absences.

Student Evaluation and Tardies/Absences

Non-compliance with clinical attendance policies will result in points deducted from the student performance evaluation.

- Absences without an official/doctors excuse will result in a two-point deduction.
- Tardies will result in a one-point deduction with notification, two points without notification.

Maximum Allowable Absences

Students are involved with clinical rotation for five semesters. The following chart is a breakdown of the semesters in the program, the number of hours, days, and shifts responsible for working and the total number of absences allowed per semester. Clock hours for first semester students includes attendance of a clinical orientation two days a week for the first four weeks of the first semester prior to entering the clinical environment.

Semester	Clinical Hours			Week and Days	Cut-Out Point
Fall 1st Year	Hrs./week 14	Alternate Shift Hours 0	Clock Hours 217	Tue, Fri.	2
Spring 1st Year	14	14	217	Tue, Fri.	2
Summer 1st Year	34	14	320	Mon-Thurs.	3
Fall 2nd Year	21	17.5	315	Mon, Wed, Thurs.	3
Spring 2nd Year	21	17.5	315	Mon, Wed, Thurs.	3

Clinical Make-up Time

Clinical experience cannot be replaced by additional studies. THE STUDENT MUST MAKE UP ALL CLINICAL TIME MISSED. THIS INCLUDES ALLOWABLE ABSENCES. Only official absences do not have to be made up. All make-up time should be scheduled by the Clinical Instructor and recorded on the last page of the clinical schedule.

Official Absences from Clinical

Clinical experiences are a major part of the student's education and cannot be replaced by additional studies. Therefore, "official absences" from clinical assignment are only those granted by the program coordinator or program director for attending radiologic technology functions or field trips. You will be required to make up time missed to represent the college in other capacities. Prior arrangements must be made.

Clinical students will be excused and will not be required to make up clinical absences due to:

1. **Job orientation for student tech position**
2. **MSRT state conference**
3. **Two campus activities a semester (WBL, Who's Who, NTHS, and Awards Day)**

CUT-OUTS

When a student has reached the above cut-out points in the classroom or in clinical, the instructor will electronically complete and submit a cut-out form. (Note: A separate cut-out form will need to be submitted for each class the student cuts-out of.) The cut-out form will be sent to the student and the Appeals Officer and a copy will be sent to the submitting teacher via e-mail. The student will not be allowed to return to class or clinical without authorization from the Appeals Officer. If a student has not appealed within 48 hours of the notification, the Appeals Officer will process the cut-out form electronically to the Admissions Office. An electronic copy will be sent to the student and the instructor notifying each of the results of the appeal.

APPEAL PROCESS/CUT-OUTS

The College reserves the right to administratively withdraw a student who reaches the cut-out point due to excessive absences. When a student has been removed from class for excessive absences, that student will have the right to appeal his/her removal from the class to the appropriate Appeals Officer. No absence is considered free; therefore, students will be responsible for providing a justifiable reason for each absence to

the Appeals Officer. Documentation should be provided to the Appeals Officer in written form where possible (doctor's excuse, obituary, legal documents, etc.). When considering appeals, the Appeals Officer will consider the following:

1. **Total number of absences**
2. **Documentation for absences**
3. **Whether the student has requested counseling or other assistance in finding a solution to class attendance problems**
4. **Recommendations by instructors**

All appeals must be made within 48 hours of the notification of removal from class for excessive absences. The Appeals Officer will have the authority to reinstate the student in the class for what he/she considers to be justifiable cause. The decision of the Appeals Officer will be final. The instructor will receive a notice of action taken. In the event that an appeal is denied or a student fails to appeal, a grade of "W" will be recorded for courses in which excessive absences are reported prior to the 12th week of class, and the student will be dismissed by the Appeals Office. Being administratively withdrawn from a class may change a student's enrollment status and thereby affect, among other things, that student's scholarships and financial aid.

WITHDRAWAL POLICIES

Dropping a Course: Students taking twelve (12) hours will be classified as full-time students. Changes in schedule may be made only with approval from the counselor and advisor. This includes adding or dropping courses. Any course(s) properly dropped prior to the twelfth week of the semester will constitute a "W". The grade "W" is not used in computing grade point average.

Withdrawal from College: For an official withdrawal during a semester, the student must obtain a formal WITHDRAWAL PERMIT from an advisor and have it signed by appropriate college personnel and presented to the Admissions Office by the twelfth week of the semester. It is the STUDENT'S responsibility to complete the withdrawal process in the Admissions Office.

GENERAL PROGRAM POLICIES

ADVISEMENT PROCEDURE

Student advisement by instructors is conducted throughout the length of the program. An advisement form with the student's degree plan and advisement conference form **(Attachment D)** is used to document academic advisement. Students will be counseled and advised of progress in the program each semester. **(Attachment E)**

Students are advised of clinical performance every five weeks. The clinical instructor documents strengths and weaknesses and discusses these with the student. The clinical coordinator calculates grades, documents suggestions and counsels students. **(Attachment F)**

The student may be counseled any time during the semester depending on performance in the course and/or program. A conference form is used to document the meeting with the student and is placed in the student's personal folder and a program advisement folder. **(Attachment G)**

Services of trained counselors and guidance personnel are available to all students. Counselors are available in the counseling center of the Henley building and the Fortenberry building. Students may go directly to the counseling center or have program instructors make an appointment for them.

ACADEMIC DISHONESTY/CHEATING

Academic integrity is an essential component of professional behavior in the medical field. Any documented incidences of academic dishonesty may result in academic penalty up to withdrawal or dismissal from the program.

The RGT program follows the college's general policies on academic integrity as set forth in the Copiah-Lincoln Community College Student Handbook. A copy of the student handbook is available in Student Services or may be downloaded from the Co-Lin website at http://www.colin.edu.

Plagiarism shall be a violation of the student code of conduct and is subject to consequences stated in the instructor's syllabus and the Disciplinary Sanctions section of the Student Handbook. Plagiarism is the presenting of words or ideas of others without giving proper credit. In addition to being a violation of the student code of conduct, plagiarism is both unethical and illegal. When a student puts his name on a piece of writing, the reader assumes that the student is responsible for the information, wording, and organization. A writer cannot copy direct quotations without providing quotation marks and without acknowledging the source. Paraphrasing material or using an original idea that is not properly introduced is the most common type of plagiarism. The college prohibits dishonesty such as cheating, plagiarism or knowingly furnishing false information to the officials or faculty of the college or their representatives. Cheating is subject to consequences stated in the instructor's syllabus and the Disciplinary Sanctions section of the Student Handbook:

1. First offense - grade of "0" for the assignment and the documents should be forwarded to the Dean of Career & Technical Education/Vice President where the student will be placed on instructional probation.
2. Second offense - documentation should be forwarded to the Dean of Career & Technical Education/ Vice President. The student will be administratively withdrawn from the course for that semester in cases of a repeat offense in that course.
3. Third offense - student will be referred to the Dean of Career & Technical Education/ Vice President for appropriate action, up to dismissal from the college.

ANY STUDENT AWARE OF ANOTHER STUDENT CHEATING MUST INFORM THE INSTRUCTOR IMMEDIATELY.

Any student who is accused of cheating will be referred to the Dean of Career & Technical Education for disciplinary action. The RGT department will recommend dismissal from the program.

CLASSROOM/LABORATORY COVID 19 GUIDELINES

Students will be divided into small groups with a maximum of 10 students per classroom/laboratory with one instructor. All students and instructors will be recommended to wear a surgical mask and maintain the recommended social distancing of 6 feet. If COVID 19 exposure does occur students will follow guidelines as set forth by the MS State Department of Health.

CLASSROOM DISCIPLINE POLICY

To ensure successful completion of the RGT program and success in the field of radiography, Co-Lin radiography instructors have adopted the following discipline policy for didactic classes concerning discipline in the classroom. Violations will be documented and placed in the student's personal folder and a general program advisement folder. **(Attachment H)**

Major Classroom Discipline Violation

Any serious violations within the classroom as deemed by the instructor of the said class may result in temporary dismissal from class. The Program Director and the Dean of Career & Technical Education will be notified immediately of any major violation by the student. Major violations will be handled on a case by case basis. The instructor and student will each document in writing the nature of the incident and the student will be referred to the Dean of Career & Technical Education for a formal disciplinary decision.

Progressive Classroom Discipline Policy

The progressive classroom discipline policy ensures that less serious violations of policy are not ongoing. Disrespectful or unruly behavior in the classroom is unacceptable and is not tolerated. General classroom behavior and expectations will be included on the course syllabus for each course.

First violation of classroom policy
The student will receive a verbal warning with written documentation being placed in the student's personal folder.

Second violation of classroom policy
The student and instructor will meet for a formal conference with written documentation signed by both parties.

Third violation of classroom policy
The student will be sent to the Dean of Career & Technical Education with a recommendation that the student be placed on "strict probation" for the duration of the program.

Fourth violation of classroom policy
Recommended dismissal from the RGT program.

It is the intent of the instructors in the program to encourage the student to succeed and perform at his/her very best. The disciplinary policies in place are utilized in order to produce the best technologists in the field of radiography.

TESTING AND LABORATORY POLICY

If a student is absent the day of a scheduled test, he/she is to make arrangements with the instructor giving the examination. The student must be prepared to take the test the first day of returning to lecture/lab.

Laboratory sessions are scheduled in one hour increments. Students completing competency exams should remain in the laboratory until all students complete competencies.

If the student is absent the day of a scheduled lab competency examination the student is responsible for getting new competency assignments and should be prepared to perform make up competency and current competencies during the next scheduled laboratory session.

CELL PHONES AND PAGERS

Cell phone use is prohibited during clinical. Air pods and all phone accessories are prohibited as well. Violation of this policy will result in the student being asked to leave the clinical site and clinical time missed will be required to be made up with a written notification placed in the student's folder. If a student is in violation of this policy three times in the course of the program, expulsion from the program will be recommended.

Students should deactivate signals from cell phones and pagers that can be heard by others during class. Students may keep pagers and cell phones on silent mode. Cell phone use (including text messaging, games and use of PDA's) in the classroom while class is in session is strictly prohibited. Co-Lin understands, however, that in certain situations it is imperative that the student be accessible through his pager or cell phone (emergencies, volunteer firefighter, etc.) Students must receive permission from the instructor to leave audible signals active.

Students found in violation of this policy will be notified by the instructor (written or verbal.) The instructor will then turn in to the Dean of Students the student's name and ID# by e-mail. The student will receive a $25 fine. Multiple offenses will result in increased fine amounts.

SSRT CLUB AND STATE CONVENTION

The Student Society of Radiologic Technology (SSRT) is an affiliate of the Mississippi Society of Radiologic technologists (MSRT). The SSRT Club provides appropriate student organization activities including leadership development and critical thinking skills. It is dedicated to the support and enhancement of the Radiologic science profession, including the advancement of radiologic technology, the promotion of higher standards of education and the improvement of patient care quality. The SSRT members have an opportunity to attend the MSRT conference each fall to learn the business of the society and to attend educational forums. Bi-annually the MSRT publishes a professional journal, The Beam, which includes research manuscripts and exhibits of SSRT of participants.

Each radiography student is expected to participate in SSRT club activities, which also includes fundraising.

Each student is required to participate in fundraising activities. Students will be responsible for selling a set amount in order to qualify as participation. The amount is set by the instructors. The fundraising covers professional dues, some fees, and attending MSRT conference. If a student chooses not to participate in fundraising, they will be responsible for the entire cost of the professional dues, fees, and MSRT conference in order to attend.

Each student is provided the opportunity to attend the MSRT convention in the fall and registry review seminar in the spring. Any student not participating in these activities will be assigned to clinical during which time other students attend professional meetings. Each student will be required to sign an ethic form for MSRT conference. **(See Attachment Q)**

SERVICE PROJECTS

Radiography students will be required to complete at least one service project each semester for a grade, except for the summer. Students will be given a service project form **(See Attachment R)** to have completed and returned to the instructor. Failure to complete the service project will result in a grade of zero. Students will need to have their project approved by the instructor prior to completing the project.

RADIATION SAFETY OFFICER (RSO)

The Radiation Safety Officer (RSO) is appointed by the program to assure compliance with all applicable legal and regulatory requirements regarding radiation safety policy, procedures and practices. The RSO is authorized to terminate immediately any project or operation that presents a radiological threat to health or property.

The RSO shall establish radiation exposure investigation levels and, if those levels are exceeded, initiate a prompt investigation of the cause of the exposure and a consideration of actions that might be taken to reduce the probability of recurrence.

The RSO is responsible for:

1. maintaining copies of pertinent regulation, license applications, licenses and amendments;
2. maintaining records of radiation monitoring and surveillance related to exposures of individuals;
3. providing instruction and services to radiation users for the safe and authorized use of radiation.

LAB EQUIPMENT REGISTRATION

The Copiah-Lincoln Community College Medical Radiologic Technology x-ray equipment is registered with the Mississippi Department of Health. The most recent certificate of registration is kept above the control booth of the energized lab. Previous certificates of registration are available upon request to the RSO.

ALARA POLICY

The program is committed to an effective radiation protection standard to eliminate unnecessary exposure to radiation and to reduce all exposures to levels that are **as low as reasonably achievable (ALARA)**. The **ALARA** principle is a formal requirement of the U.S. Nuclear Regulatory Commission, the International Committee of Radiation Protection and the National Council of Radiation Protection and Measurements (NCRP).

The ALARA principle is implemented by a comprehensive radiation protection program that includes specific requirements and procedures for:

1. radiation personnel monitors for all radiation users,
2. only authorized radiation users in the energized lab,
3. no radiation users permitted in energized lab during exposures,
4. no primary beam being directed at the control booth,
5. students must review and initial each bi-monthly Landauer report.

DOSIMETERS

The student is furnished a radiation dosimeter by Copiah-Lincoln Community College. The student will be required to pay a one-time set up fee of $75 for the radiation dosimeter. This dosimeter must be worn during all clinical assignments and to all energized radiography labs. When a lead apron is worn the dosimeter is placed at the collar outside the apron. Students declaring pregnancy will be provided with an additional badge to be worn at waist level. Students are not to wear dosimeters issued by the radiology program at student tech jobs.

Students without a dosimeter will be dismissed from clinical or laboratory assignments. If the dosimeter is lost the student cannot return to clinical until the replacement dosimeter arrives. All clinical time missed because of missing dosimeters must be made up by the student.

Students are required to exchange dosimeters every two months. Failure to exchange his/her dosimeter at scheduled time will result in dismissal from clinical or energized laboratory assignments until the dosimeter exchange is completed. The student will be recorded absent for any time missed due to failure to exchange dosimeter and must make up time missed from lab or clinical. Students found in violation of badge exchange policy will be given verbal and written notification. The student's name and ID will be turned into the Business Office. The students' business account will be charged $40.00 for fee charged by Landauer for not returning badges or meeting the deadline for badge exchange.

Purposely exposing or tampering with any dosimeter is **grounds for dismissal** from this program.

RADIATION SAFETY EDUCATION

Students must understand and follow the general rules and procedures for working safely with radiation sources. It is required that all students pass a radiation safety procedure test with a score of 80% prior to entering clinical. The program uses radiation safety procedures presented in The Radiation Safety Policy Manuel. Test scores will be maintained in the student's personal folder.

ENERGIZED LAB and CLINICAL RADIATION SAFETY POLICIES

Students and instructors are required to practice ALARA principles while working in clinical and the energized lab as outlined in the Co-Lin Radiography Energized Lab Orientation in RGT 1413 Imaging Principles.

1. A dosimeter is to be worn at collar level for all energized lab and clinical assignments. An additional badge will be provided to wear at waist level for students who have declared pregnancy.
2. All students are required to be outside energized room with door closed before making exposure.
3. The main breaker is only to be turned on while a registered radiologic technologist is present.
4. Students should maintain ALARA principles of time, distance, and shielding.
5. Students are prohibited from holding patients, phantoms, or image receptors during x-ray exposures if other immobilization methods are available.

RADIATION EXPOSURE LIMIT POLICY

The maximum acceptable dosimeter readings set for this program are 500 mrem (.5rem) (5mSv) bimonthly whole body, and/or 1,000 mrem (1rem) (10mSv) annual whole body. The embryo/fetus limits are 500mrem (.5rem) (5mSv) for pregnancy and/or 100 mrem (.1rem) (1mSv) bimonthly during pregnancy. Students will be counseled by the RSO for doses of 100 mrem (.1rem) (1mSv) or greater. Pregnant students will be counseled at 25 mrem (.025 rem) (.25mSV). This information will be documented and maintained in student records.

Any reading exceeding NRC standards, the RSO and/or program director will report this to the Mississippi Department of Health Division of Radiological Health. The program will follow any recommendations made by this agency.

RADIATION MONITOR REPORTS

Bi-monthly reports of radiation exposure are made available for students to review and initial. A printout of the two most recent dosimeter reports will be posted on the bulletin board located in Classroom 103. All posted

reports will meet HIPAA requirements. Dosage reports are filed and maintained in the office of the RSO. If any readings are above dosage limits for bi-monthly readings, the proper steps will be taken to report the incident.

Past dosimeter reports are available upon request. Graduates are mailed a comprehensive report of exposure after completion of the radiography program. A copy of the final dosimeter report is maintained in the student's personal folder.

Any radiation user may communicate directly, in confidence and without prejudice, with the RSO, Mississippi State Department of Health, or the U.S. Nuclear Regulatory Commission on any matter concerning radiation protection. The US Nuclear Regulatory Guide #8.29 gives instruction on occupational exposure to radiation. **(Appendix B)**

MRI SAFETY PROTOCOL

There are potential risks in the MRI environment, not only for the patient, but also for family members, health care providers, and anyone who steps into the MRI environment. Therefore, students are restricted from the MRI area unless approval is granted after proper screening.

Initial safety screening will take place during clinical orientation prior to the students' entrance into the clinical environment. The student will be informed of potential hazards in the MRI environment and complete a safety questionnaire. Clinical affiliates will be notified of any concerns related to individual students.

The student must notify program and clinical officials should his or her status change at anytime through out the program.

The completed MRI Safety Screening form will be placed in the students' clinical handbook and the MRI technologist at the facility MUST review the screening tool and sign before a student can enter the MRI area.

If the student is approved to enter the MRI environment he/she must remove all metallic objects before entering including, but not limited to hearing aids, beeper, cell phone, keys, eyeglasses, hair pins, barrettes, jewelry (including body piercing jewelry), watch, safety pins, paperclips, money clip, credit cards, bank cards, magnetic strip cards, coins, pens, pocket knife, and nail clippers.

EMERGENCY/GENERAL POLICIES AND REGULATIONS

Students must review the following policies in the student handbook.

- WOLF ALERT
- MEDICAL EMERGENCIES
- FIRE
- SEVERE WEATHER/TORNADO
- EVACUATION
- EARTHQUAKE
- ARMED INTRUDER
- PUBLIC INTOXICATION
- PISTOLS, FIREARMS, or OTHER WEAPONS ON COLLEGE PREMISES
- SEARCH and SEIZURE
- SEXUAL HARASSMENT POLICY
- CURFEW and GUEST POLICY

TOBACCO FREE CAMPUS

In order to promote a healthy environment for students, faculty, staff, and visitors, Copiah-Lincoln Community College is tobacco-free in all locations, Wesson, Natchez, and Simpson County Center, the use of tobacco and smoking products which include vape products, E-cigarettes, E-liquid, and other non-tobacco inhalants are not permitted on any property owned by the college, which includes, but is not limited to, buildings, grounds, parking areas, walkways, recreational and sporting facilities, and college-owned vehicles.

GENERAL APPEALS AND COMPLAINTS

The administration and faculty of Copiah-Lincoln Community College recognizes the right of each student to make an official complaint or appeal a decision. To ensure the protection and rights of every student the following policy of the college will be used.

GRIEVANCE PROCEDURE/STUDENT COMPLAINTS

Any student who wishes to make a formal complaint to the college regarding a college program, a service of the college, an employee of the college, or any other individual or aspect of the college, should express the nature of the complaint and pertinent information in writing to the appropriate person and in the sequence listed below:

1. Medical Radiography Program Director (if Director is involved proceed to the next person)
2. Dean of Career & Technical Education
3. Associate Vice President of Instructional Services
4. President of the College

The college representative receiving the complaint will either handle the complaint personally or will refer it to the appropriate person for disposition. Students have a right to due process for any grievance.
All student complaints will be handled and final determination will be made by college personnel who are not directly involved in the alleged problem. A written response will be provided to the student within three (3) working days of receipt of the written complaint. If the complainant is not satisfied with the resolution of the grievance, the complainant may then appeal to the President in writing within three (3) working days of the previous decision. Any complainant who does not submit a written appeal by that date forfeits any further consideration in this matter. The President's decision will be final. Student complaints must be filed no later than the end of the following semester after the issue in question occurred. No adverse action will be taken against the complaining student by college personnel as a result of the complaint.

STUDENT APPEALS FOR DISCIPLINARY ACTION

Appeals of disciplinary action taken as a result of misconduct shall be submitted in writing to the appropriate person and in the sequence as listed below:

a) From action by instructor to the appropriate Dean
b) From the Dean to the Vice President of the Wesson Campus
c) From the Vice President of Wesson Campus to the President

A written response will be provided to the student within three (3) working days of receipt of the appeal.

COMPLAINTS RELATED TO JRCERT STANDARDS

The "STANDARDS" for accreditation are provided at the end of this handbook. Students have a right to report any non-compliance of JRCERT Standards. Any formal complaints of non-compliance of JRC-ERT Standards by

Copiah-Lincoln Community College Radiography Program should be reported first in writing following the grievance policy of the Medical Radiologic Technology program.

If resolution has not been met by following the grievance policy of the Radiography program the-incident(s) can be reported to JRCERT by calling (312)704-5300 or E-Mail: mail@jrcert.org

CLINICAL

CLINICAL ORIENTATION

Students are required to attend clinical orientation in July prior to entering the clinical environment. During these orientation students will receive instruction that will

1. Inform him/her of the blood-borne pathogens standard and all components involved;
2. Allow students to identify procedures or tasks, which have potential for exposure to bloodborne pathogens;
3. Direct students in the appropriate selection and use of personal protective equipment (PPE);
4. Stress the importance of patient confidentiality and HIPAA regulations;
5. Inform him/her of MRI safety
6. Inform students of potential hazards in the MRI environment safety screening form.

CLINICAL ASSIGNMENT/PLACEMENT POLICY

The Medical Radiologic Technology program is affiliated with the following hospitals:

King's Daughters Medical Center	Brookhaven, MS	max of 4 students per/semester
Southwest Mississippi Regional Medical Center	McComb, MS	max of 4 students per/semester
Merit Health Natchez	Natchez, MS	max of 3 students per/semester
St. Dominic's Memorial Hospital	Jackson, MS	max of 4 students per/semester
Merit Health Central	Jackson, MS	max of 6 students per/semester
VA Medical Center	Jackson, MS	max of 6 students per/semester
Capital Ortho Clinic	Flowood, MS	max of 1 students per/semester
Copiah County Medical Center	Hazlehurst, MS	max of 2 students per/semester
Franklin County Medical Center	Meadville, MS	max of 2 students per/semester

The Clinical Coordinator is responsible for scheduling all clinical assignments. Students are assigned to one clinical affiliate per semester. Students will rotate through a **minimum of four (4) clinical facilities during the course of the program with a minimum of one (1) to two (2) rotations in a Jackson facility**. Placement of the student is not only dependent on where the student resides during the current semester, but the total clinical capacity of the facility and the number of students enrolled in the program. All clinical sites will have at least one (1) student scheduled each semester. Requests of the student, requests of the clinical facility, extracurricular activities of the student, and driving distance is taken into consideration in order to assure that placement is fair and consistent. **All educational experiences must be considered and met for each student when determining clinical placement.**

Students will not be assigned to a clinical affiliate, regardless of preference, where a student has a personal relationship with an employee. Employees include spouse/partner, cohabitant, parent, stepparent, mother or father-in-law, grandparent, siblings, half-brother, half-sister, stepsibling, brother-in-law, sister-in-law, aunt, or uncle.

NIGHT AND WEEKEND ASSIGNMENTS

Hospitals operate twenty-four hours a day, thus radiologic services must be provided around the clock. Weekend, evening, and night shifts provide unique experiences.

1. First year students will **not** be assigned to clinical on the weekend or evening shifts during their first semester.
2. Students will be assigned to the day shift one weekend during their second semester of clinical.
3. Students will be assigned one week of the evening shift during the summer semester.
4. Students will be assigned to one weekend evening shift during their fourth semester of clinical.
5. Students will be assigned to one weekend evening shift during their fifth clinical semester.

*NOTE: The student to technologist ratio is 1:1 during all clinical education assignments, including weekend, evening and night shifts.

CONFIDENTIALITY

Health-Insurance-Portability and Accountability Act (HIPAA Policy)

Copiah-Lincoln Community College and the Medical Radiologic Technology program acting as a business partner for the purpose of clinical training activities with area hospitals agrees to comply with the standards set forth in the HIPAA, Privacy Rule, CFR 45 Parts 160 and 164, Subpart A and E ("Privacy Rule"). Students will be required to attend a HIPAA orientation prior to the beginning of clinical assignments.

The Health Insurance Portability and Accountability Act (HIPAA) require that a patient's identity and personal health information be protected. Health care providers who violate HIPAA can face stiff penalties, including fines up to $250,000 and/or imprisonment for up to 10 years for knowingly misusing individually identifiable health information.

Social Media

Any communications, whether via College internet resources, non-College resources, social media, blog or otherwise which could damage or bring disrepute to Copiah-Lincoln Community College, its employees, or any members of the Board of Trustees may result in discipline up to and including termination of employment for employees and revocation of College issued scholarships for students. NOTE: Employee participation in social media sites is discouraged during the workday and must not interfere with the performance of job duties. Students and employees are legally responsible for their commentary and content, and can be held personally liable. Copiah-Lincoln Community College will assume no legal responsibility should outside parties pursue legal action against a social media user for their postings within the College domain. Facebook, Twitter and other social media venues are available for individuals to express opinions and communicate with others. Copiah-Lincoln Community College provides the following guidelines and practices for employees/students regarding social media.

1. Any profile or page set-up to represent Copiah-Lincoln Community College must be approved by the Office of Public Information or Director of Technology.
2. Each profile should be administered by Co-Lin personnel i.e. club advisor.
3. Profiles should be kept up-to-date and monitored weekly for derogatory or negative statements regarding the College by others.
4. Posts should be in good taste and exhibit proper grammar, spelling, punctuation and formatting before they are published.

5. Inappropriate content should be avoided including but not limited to, profanity; racist, sexist, discriminatory, threatening or defamatory remarks; personal attacks or derogatory statements or information that may be considered personal and/or embarrassing to another person.
6. Copiah-Lincoln Community College reserves the right to request the removal of content and links it deems inappropriate.
7. The College should be addressed as "Copiah-Lincoln Community College" or "Co-Lin". Correct punctuation is required.
8. Logos may be requested through the Office of Public Information.

Please note that nothing in this policy is intended to hinder individuals First Amendment rights to freedom of speech or freedom of the press.

Slanderous Remarks

It is important to maintain confidentiality of our clinical affiliates and their staff. If the student has problems or complaints regarding an affiliate or its staff he/she may discuss them only with his/her instructors or an administrative technologist of that affiliate. If the students are found guilty of making derogatory remarks about any affiliate or its staff he/she will be written up and placed on disciplinary probation.

Recording Devices

The student is **NOT** allowed to use tape recorders or cameras in the **classroom** or **clinical** areas. Any and all information regarding patients, their conditions, and their families must be kept confidential. Any discussion will be limited to the classroom and post conferences for learning experiences only. If the student is found guilty of discussing a patient, his/her condition, the diagnostic procedures performed on the patient or the patient's family, he/she will be terminated from the program. **ANY BREACH OF CONFIDENTIALITY IS GROUNDS FOR SUIT BY THE PATIENT.**

The student will sometimes be asked to develop research papers or case studies for educational purposes. The student is not allowed to include a patient's name or any information that can be used to identify the patient on either the written report or copied radiographs.

CLINICAL ENVIRONMENT

Many differences exist between the academic environment to which the student has been accustomed and the clinical environment that he/she is entering. Most of the differences will prove exciting and stimulating; some will prove to be frustrating and aggravating. How successfully the student functions and learns in the clinical setting depends in part on how he/she approaches and deals with these differences.

The reality of the situation is that the efficient, effective operation of the department, so as to deliver optimal patient services and care, is the top priority. This means that the patients' welfare is considered first. Usually this is consistent with the goals and needs of clinical education. Occasionally; however, this reality dictates that the scheduling and conduction of educational activities be flexible.

Compared to the learning activities conducted on campus in the classroom setting, the learning activities in the clinical setting are frequently much less structured. The student must take a more active and responsible role for integrating the academic preparation he/she receives with the individual examinations he/she is observing or performing.

Generally, in the classroom setting students work independently as he/she pursues academic goals. Teamwork and cooperation among the students are not a necessity to achieve academic goals. In the clinical setting the student must pursue his/her educational goals within the overall goals of the department to deliver quality patient services efficiently and effectively. Rather than function independently of the departmental goals, the

student becomes part of a health care delivery team and functions cooperatively to achieve educational and departmental goals.

Another difference between the academic environment and that of the clinic has to do with how students view making of a radiograph. When students make radiographs of acrylic phantoms in the laboratory on campus, his/her attention is narrowly focused on the mechanics of producing the radiograph. There is obviously no need to be concerned or cautious about the welfare of the "patient." In the clinical situation the student must develop the ability to expand his/her attention, so that it includes the mechanics of producing radiographs of optimum quality, and awareness of the patient as a person and not simply an exam to be completed.

Undoubtedly, the student will be able to add more differences to our list. The point is that the student is making a transition that will require some reorientation and adaptation to his/her part. The student is not the only one; however, involved in this process. This is a time of transition also for the students in the class ahead of you who are assuming a new role and responsibilities as second year students. The clinical staff is also involved in reorientation and adaptation. At the point when students enter the hospital, they have been working with students who are for the most part requiring minimal supervision. The staff must cycle back and assume a direct supervisory role all over again.

PROFESSIONALISM

In an effort to promote excellence in the professional and ethical conduct of students and to provide the highest quality of medical care for patients, the following policies are currently in effect for students in the Copiah-Lincoln Community College Radiologic Technology Program.

Professional Behavior

The student is expected to treat patients with kindness, courtesy and respect. Before transporting patients from the ward or waiting area, the student is to introduce him/herself to establish rapport. Once the patient is in the exposure room, keep the door closed and make sure that patients are properly gowned or covered.

Professional behavior is not limited to student contact with patients. It is reflected in the student's attitude, and in the way he/she communicates with physicians, supervisors and co-workers. Typical examples of non-professional behavior are:

1. Gossip.
2. Discussion of clinical information with patients or relatives.
3. Discussions pertaining to work, in elevators or other public areas.
4. Discussions, which are not meant for the ears of patients or relatives, within their hearing distance.
5. Petty quarreling with other students or hospital personnel.
6. Allowing personal life to interfere with clinical responsibilities

Professional Appearance

Hospitals and their employees are expected to set examples of cleanliness and appearance. As a student you are expected to meet or exceed the standards listed below:

Hygiene

The student is expected to practice good personal hygiene in such a way as to avoid body odor and halitosis. The student's hands and nails must be kept clean. Nails are to be trimmed to a minimal length and colors should be conservative, not loud or eccentric. ARTIFICIAL NAILS ARE NOT PERMITTED IN PATIENT CARE AREAS.

Cosmetics and Jewelry

The use of cosmetics, jewelry and colognes must be kept conservative. Body or facial jewelry is not acceptable. Male students are not allowed to wear earrings in the clinical setting. Female students are allowed to wear one pair of stud earrings in the lobes of the ears. Heavy scents are offensive to sick patients and the use of too much jewelry and makeup may lead the patient to distrust the student as a professional.

Tattoos

No visible tattoos are allowed in the clinical setting.

Hair

The student is expected to keep his/her hair, including facial hair, clean and neatly styled. Hair color should be conservative, and no decorative attachments are allowed. No hats are allowed.

Clinical Attire

The student is expected to wear royal blue scrubs with a solid white lab coat. The Copiah-Lincoln Community College emblem should be sewn on the left sleeve. These may be purchased during the first semester. Low cut white athletic shoes or surgical scrub shoes may be worn. Opened toed shoes nor high top shoes are allowed in the clinical setting. The student's uniform must be clean and neatly pressed. Shoes must be clean and well polished. If a dress uniform is worn it must be long enough to keep the student well covered while performing his/her work. Hosiery is to be worn with a dress uniform. Bare legs are not permitted.

Identification

The student is required to wear a Co-Lin name tag at all times during assignments. In cases where a hospital ID badge is issued, the student must wear both the hospital ID badge and their Co-Lin name tag. The name tag is worn at chest level. Name tags are not to be worn at the waist or below. In addition, the student is required to take his/her Co-Lin "I.D." badge with them.

Campus Attire

Professional Image Guidelines will be provided during the orientation period.

RESPONSIBILITIES OF STUDENTS IN THE HOSPITAL

The primary function of the hospital is patient care. Under no circumstances should the presence of students downgrade the quality of patient care. It is the student's responsibility to:

1. Follow the administrative policies established by the radiology department and the hospital.
2. Check the posted rotational schedule and report to the assigned work area in an alert condition on time.
3. Possession, use or being under the influence of liquor or illegal drugs while on clinical assignment are grounds for dismissal of the program. Random drug testing may be administered at the student's expense.
4. Notify the clinical coordinator and the clinical affiliate at least fifteen minutes before his/her scheduled time in case of illness or absences that are beyond the student's control
5. Report to clinical assignment in proper uniform.
6. Demonstrate respect for clinical instructors, supervising technologists and other hospital officials. Insubordination is grounds for dismissal.
7. Wear his/her dosimeter as outlined in the program study.
8. Check with the supervising technologist before leaving the assigned work area. Leaving the clinical affiliate during assigned hours without permission is grounds for dismissal from the program.
9. Follow the directions provided by supervising technologists and accept assignments commensurate with your capabilities.

10. Eat only in designated areas (never in the presence of patients).
11. Smoke only in designated areas (never in the presence of patients) and only after patients and other clinical responsibilities are attended. Individual hospital policies regarding smoking should be followed at all times.
12. Maintain a professional attitude when in the presence of other students, hospital personnel, program faculty, physicians and patients.
13. Maintain the confidentiality of hospital records and patient information in a professional manner.
14. Politely refuse any type of gratuity "tip" offered by a patient or a patient's family.
15. Spend his/her entire clinical shift learning and reinforcing his/her knowledge of radiography. After all patients and other clinical responsibilities have been attended to, the student may practice positioning and manipulation of the equipment to improve efficiency in patient care areas. Studying and hobbies such as needle work, card playing, etc. are prohibited while on clinical assignment.
16. If the student wishes to be in a radiology department at times not specified for clinical assignment he/she must get permission from the clinical instructor or chief technologist.
17. Leave valuables at home. Copiah-Lincoln nor the clinical affiliates will be responsible for lost or stolen property of the student, while on clinical assignment or campus.
18. Practice radiation safety standards as taught in principals of Radiation Protection.

EQUIPMENT PROFICIENCY

The student is expected to demonstrate the listed tasks associated with equipment and have the supervising technologist complete the form provided in the student's clinical book. This is to be done each semester by the first year students on all rooms or equipment the student is assigned to. **(Attachment G)**

DEVELOPING CLINICAL PROFICIENCIES

Clinical skills can be developed by following a systematic step by step approach. The following sequence of steps will generally produce outstanding technologists:

- Academic Preparation
- Observation
- Assisting Qualified Worker
- Supervised Trial Performance
- Clinical Competency Evaluation
- Performance Maintenance

Academic Preparation
Students are beginning this phase of his/her education on Co-Lin campus by studying anatomy and physiology, radiographic positioning, radiation safety, ethics, radiographic technique, etc. This will be an ongoing process through his/her fifth semester. This is an important part of student preparation, but without clinical participation it is worthless. As students learn new things in the classroom and laboratory, he/she will be expected to apply this knowledge in the clinical setting.

Observation
The student's initial activities in the hospital will consist primarily of observing qualified technologists at work.

Assisting Qualified Worker
Once the student feels comfortable in the radiographic exposure room, he/she will be given an opportunity to assist the supervising technologist in performing those radiographic procedures which he/she has performed in the laboratory.

Supervised Trial Performance/Practices
As the student develops confidence and proficiency, he/she will be given the opportunity to complete entire examinations under the direct supervision of a technologist. A technologist will observe the student and step in whenever the need arises. The student does **not** need to be checked off in the laboratory in order to perform procedures under the **direct supervision** of a technologist. The student is encouraged to have the exams that are performed under direct supervision signed off in the list of exams located in the back of the clinical workbook as practice.

Competency Evaluation
When the student feels qualified to complete a particular examination without help, the student requests a clinical competency evaluation. Show the supervising technologist the laboratory check sheet in the back of the clinical workbook. The student must have passed the lab evaluation of the procedure first and have the form initialed by a Co-Lin Instructor before proceeding with the evaluation in the hospital.

Student competency evaluations can be accessed by entering the Trajecsys system as a clinical instructor or from the student navigation page. The student must score 80% to pass a clinical competency evaluation. Passage certifies that the student is qualified to perform an examination under indirect supervision.

Completion of the required number of clinical competency evaluations contributes to clinical course grades. students must complete the ARRT Radiography Didactic and Clinical Competency Requirements to sit for the ARRT examination Do not wait until the end of the semester to request these evaluations. Grades will be averaged and if the required number of procedures is not obtained, this will result in a zero for each requirement not met. **(Attachment H)**

Performance Maintenance
Once the student passes the performance evaluation for a particular examination he/she will need additional practice to maintain and perfect their skill. The student may now do this examination with indirect supervision. (A technologist must be near by, but not necessarily in the exposure room). However, if a repeat examination should become necessary a qualified technologist or radiologist must be present to provide direct supervision. A competency may be revoked by the clinical instructor or clinical coordinator if the student is unable to perform the procedure without assistance.

Students rotating to another room must show his/her list of examinations to the supervising technologist so he or she knows exactly which examinations the student can do alone and which must be closely supervised.

CLINICAL PERFORMANCE EVALUATION

In facilities where applicable, supervising technologists will complete a Technologist Observation form on the student working with him/her each week. The form is reviewed by the Clinical Instructor and used only as an informative tool to assess student performance in different areas. **(Attachment I)**

Students will be evaluated by the Clinical Instructor every five weeks for overall competency of clinical skills with respect to program level. The Clinical Instructor will document and discuss strengths and weaknesses with the student and verification is made by signature of the student and Clinical Instructor. **(Attachment E)**

The Clinical Coordinator reviews, documents absences, and grades performance evaluations submitted by the Clinical Instructor. The Clinical Coordinator reserves the right to make changes on the Performance Evaluation to reflect positive and negative comments made on the evaluation and to reflect the Coordinators observation of student performance. The Clinical Coordinator will document and discuss strengths and weaknesses with the student and verification is made by signature of the student and Clinical Coordinator**. (Attachment E)**

FINAL COMPETENCY EVALUATION (2nd YEAR)

A master list with six categories of exams will be provided in the students' clinical handbook. The student will complete one final competency from each of the six and two mandatory surgery final competencies upon completion of the program. Three of the category final competencies and one final surgery competency will be completed during Clinical IV and the remaining category final competencies and one surgery final competency will be completed during Clinical V. One final competency from each category must be completed. The purpose of final competency evaluations is to ensure students are retaining clinical knowledge learned. (Attachment J)

When the student has successfully completed clinical competency evaluations on most examinations in a category, the student will request a Final Competency Evaluation from the Clinical Coordinator or Clinical Instructor. The category for final competencies is chosen by the student. The Clinical Coordinator or the Clinical Instructor will determine the examinations to be used and the particular exam will not be known to the student. Students should not wait until the end of the semester to request a Final Competency Evaluation. These evaluations contribute to the end of the semester grade. The Final Competency Evaluation form will be used for grading the final competency performance. (**Attachment K**)

During Clinical V, the student will be required to perform an additional TWO final competency exams from the category of the clinical instructor's choosing. In this case the Instructor will choose the category and the exam.

EXIT EVALUATION (2nd YEAR)

During the students last semester, a Supervising Technologist(s) and Clinical Instructor will complete a Graduate Exit Evaluation of the students' competency of entry level work skills in radiography. The exit evaluation will be completed at the end of the students first two weeks of the semester and repeated two weeks before the end of the semester. The purpose of the evaluation is to assess work preparedness of students/graduates entering the workforce. The student must pass the exit evaluation to successfully complete clinical. **(Attachment L)**

SPECIALTY AREA ROTATIONS (2nd YEAR)

Students may rotate through specialty areas listed below during their second year of clinical. There should always be direct supervision in these areas. Supervising Technologists will fill out specialty area observation forms located in the student's clinical handbook. Information from this observation will be used for the students Clinical Performance Evaluation by the Clinical Instructor.

ULTRASOUND
NUCLEAR MEDICINE
MRI
CT
RADIATION THERAPY
ANGIOGRAPHY
MAMMOGRAPHY

MRI ROTATION

MRI is an elective rotation for second year students. Rotation through this area is limited to students who are properly screened and who are **not** at risk for a potential adverse incident. The student must follow the MRI Safety Screening Protocol located in the Radiation Safety section of this handbook to rotate through this area.

MAMMOGRAPHY PROCEDURES

Clinical students may request the opportunity to participate in clinical mammography rotations. The program will make every effort to place a clinical mammography rotation if requested; however, the program is not in a position to override clinical setting policies that restrict clinical experiences in mammography to students. Students are advised that placement in a mammography rotation is not guaranteed and is at the discretion of a clinical setting.

CLINICAL SUPERVISION POLICIES

Clinical Coordinator

The Clinical Coordinator is responsible for coordinating clinical assignments and activities. Changes in clinical schedules or problems in affiliates must be directed to the clinical coordinator. Clinical Coordinator duties include clinical grades, counseling and articulation of campus and clinical activities.

Clinical Instructors

Each clinical education center has one or more persons designated as Clinical Instructor(s). This person(s) is (are) responsible for coordination of clinical instruction and student evaluation. He/she is also a liaison between the college and the clinical education center. Both students and staff should feel free to communicate with clinical instructors on any aspect of clinical education.

Clinical instructors are employed by the clinical education center and do have departmental responsibilities. However, they must have release time for these departmental duties in order to carry out their educational responsibilities.

Clinical Assignment

Students are not allowed to replace paid staff. Clinical instructors or radiology department administration may alter student assignments for educationally valid reasons only.

Direct Supervision and Indirect Supervision

The JRCERT defines direct supervision as student supervision by a qualified radiographer who:

- Reviews the procedure in relation to the student's achievement,
- Evaluates the condition of the patient in relation to the student's knowledge,
- Is physically present during the conduct of the procedure, and
- Reviews and approves the procedure and/or image.

Students must be directly supervised until competency is achieved. Once students have achieved competency, they may work under indirect supervision. The JRCERT defines indirect supervision as student supervision provided by a qualified radiographer who is immediately available to assist students regardless of the level of student achievement.

Repeat images must be completed under direct supervision. The presence of a qualified radiographer during the repeat of an unsatisfactory image assures patient safety and proper educational practices.

Students must be directly supervised during surgical and all mobile, including mobile fluoroscopy, procedures regardless of the level of competency.

VENIPUNCTURE POLICY
*ONLY 2nd year students are allowed to check off in clinicals

The Radiologic Technology Program requires students to have experience with Venipuncture during his/her second year. This should always be under direct supervision.

Second semester students are taught venipuncture using an arm phantom. Students are allowed on a voluntary basis the opportunity to perform venipuncture on classmates under the direct supervision of the instructor. Students must sign a consent form prior to the procedure.

Each Radiology Department should orientate each student to departmental policies and procedures on venipuncture before allowing students to perform this procedure.

Venipuncture performed by students should be limited to the condition of the patient and the presence and condition of the patient's veins. The supervising technologist is responsible for making this determination. Students are not allowed to stick patients more than twice. **(See Attachment M)**

REPEAT EXPOSURE POLICY

Students may repeat radiographs only under "direct supervision". Under no circumstances may a student perform a retake without a technologist present. All repeat exams performed by the student must be documented in the student's clinical workbook and initialed by the supervising technologist. (**See Attachment N**)

FLUOROSCOPY POLICY

The use of fluoroscopy for the purpose of positioning and/or checking the position of a patient for a radiologic exam is unacceptable. The ASRT recognizes that the "routine use of fluoroscopy to ensure proper positioning of a patient is an unethical practice". Violation of this policy will result in disciplinary action and may be **grounds for dismissal** from the program.

AIRBORNE PRECAUTION POLICY

Students will not be allowed to x-ray any patient under airborne precautions or cases where a fitted particulate respirator is required.

COVID-19 PRECAUTION POLICY

Students in Clinical II, III, IV, and V will be allowed to x-ray patients that are COVID-19 positive or potentially positive for COVID-19 when wearing an N-95 mask and following proper isolation imaging guidelines. The student must also acknowledge and sign the *Covid-19 Guidelines for Radiologic Technology Students* and the *Covid-19 Radiology Wavier Form* (**See Attachment O**). The guidelines of the clinical site in which the student is assigned will supersede the guidelines of Copiah-Lincoln Community College.

STATEMENT ON IMMUNIZATIONS FORMS AND VACCINES

Clinical experiences are a significant part of the educational process of those in the MRT program. In order to successfully progress through the programmatic curriculum, the timely completion of clinical rotations is critical. **To start a clinical rotation, all students are required to sign and date the "Statement of Immunizations Form"** (**See Attachment P**), demonstrating agreement to the stipulations outlined. Once this form is completed, it is to be submitted to the Clinical Coordinator for verification prior to going to the assigned clinical environment.

While Co-Lin does not require that all students are vaccinated in order to be admitted into a restricted admissions health program, **vaccinations may be required by our clinical facility affiliates in order for our students to enter and participate at these facilities**. Students enrolled in the MRT program and progressing to Clinical practice I, II, II, IV, & V at a clinical affiliate will need to provide proof of vaccination to the affiliate prior to attending clinical rotations.

CLINICAL DISCIPLINE POLICY

The RGT program is committed to assisting students to ensure success in the radiography program and the medical profession. Teamwork, professionalism and quality patient care are of extreme importance in the medical profession.

All policy violations and disciplinary decisions will be documented and placed in the student's personal file and the program's advisement file.

Major Clinical Discipline Policy

Any serious clinical violations as deemed by the Clinical Instructor or department manager of the clinical affiliate may result in immediate dismissal from clinical. Radiography Instructors, Program Director, Dean of Career & Technical and Education, or the Assistant Dean of Career and Technical Education will be notified and students are to immediately report to Co-Lin. Major violations will be handled on a case by case basis.

Progressive Clinical Discipline Policy

Because of the serious nature of the clinical environment a progressive discipline policy will be enforced for less serious violations of policy. This policy is to ensure that ongoing violations of clinical policies are not tolerated. These violations interfere with work flow and disrupt the radiology department in which we are guests.

Step 1 Warning

The student receives a verbal warning from the Clinical Instructor / Co-Lin Instructor or a written warning on the clinical evaluation.

Step 2 Conference

Students will attend a conference with Radiography Instuctors. The student will meet with Instructor in a formal conference to review the violation.

Step 3 Dean of Career & Technical Education

Instructors will provide the Dean with all written documentation and will make an appointment for the student to meet with the Dean. Dismissal, withdrawal, or probation will be considered at this time.

Step 4 Dismissal

If student is on probationary status, the fourth infraction will result in a second meeting with the Dean. Instructors will recommend dismissal from the program at this time.

Example Disciplinary offenses

Non-compliance with dress code and/or uniform policy
Unsatisfactory clinical performance
Non-authorized phone use
Creating or contributing to unsanitary conditions
Disturbing others at work
Excessive personal visits or phone calls
Lack of initiative (loitering or loafing during work hours
Negligence
Smoking at inappropriate times or locations
Leaving assigned area without consent
Violation of safety rules or hospital safety practices
Provoking or reacting to provocation
Careless damage to hospital grounds or property
Use of profanity
Failure to abide by "repeat policy"; "direct supervision policy" or other CLCC or hospital policies
Extended breaks and/or lunch break
Excessive talking or playing; loud behavior
Falsification of clinical attendance (including using cellular device to check in and out)

COPIAH LINCOLN
COMMUNITY COLLEGE

I have read and do fully understand the COPIAH-LINCOLN COMMUNITY COLLEGE RADIOGRAPHY TECHNOLOGY STUDENT CLINICAL HANDBOOK. I further agree to abide by all rules and regulations contained in this handbook as well as the rules and regulations of the clinical affiliate to which I am assigned while enrolled in the Radiography Program. Failure to abide by the rules and regulations is grounds for dismissal from the program.

STUDENT'S SIGNATURE _____ DATE _____

Received By:

CO-LIN MEDICAL RADIOLOGIC TECHNOLOGY STAFF _____ DATE _____

THE ABOVE POLICIES FOR THE COPIAH-LINCOLN COMMUNITY COLLEGE MEDICAL RADIOLOGIC TECHNOLOGY PROGRAM HAVE BEEN READ AND APPROVED BY:

Dr. Sharolyn Magee
Dean of Career & Technical Education

7/23/24
Date

Mrs. Jackie Martin
Vice President of Wesson Campus

8/14/24
Date

Dr. Dewayne Middleton
President
Copiah-Lincoln Community College

8/14/24
Date

Attachment A

Copiah-Lincoln Community College
Hepatitis B Vaccine Consent Form

NAME:_____ SSN:_____

Hepatitis B is a viral illness that can cause serious illness and liver disease. The virus causing Hepatitis B is present in many people who are not aware of it. Those working in hospitals and other health care facilities frequently come in contact with blood and blood products that can pass on the Hepatitis B virus to us. In an attempt to secure the well being of our students and to avoid the spread of this disease, the school is recommending the Hepatitis B recombinant vaccine. Since the disease does cause a significant amount of severe illness, cirrhosis, potential liver cancer and occasionally even death, Co-Lin highly recommends that the student take the vaccine.

The vaccine is made by recombinant gene technology and there is no risk of acquiring AIDS or any other infection from taking the vaccine. Minor reactions, such as soreness at the injection site, can occur, but serious reactions are rare (Less than 1 in 10,000 injections). Those who know they are allergic to yeast who have a hypersensitivity reaction to a previous Hepatitis B vaccination should not take the vaccine. If you are now pregnant or have active infection, you should delay vaccination unless an exposure occurs. If an exposure occurs, a decision will be made on an individual basis.

Below are two options that you are offered with respect to the Hepatitis B vaccine. You may elect not to take the vaccine; you may elect to take the vaccine as an intramuscular injection.

You will select Option A or Option B below

A. I do not wish to take any vaccine to prevent me from getting Hepatitis B. I realize that Hepatitis B is a very serious illness causing severe liver damage and potential death. I also realize that the disease, if I get it, can potentially be passed on to my family and any unborn children. I understand that the vaccine has a very low risk of any kind of reaction and that the vaccine will not expose me to any risk of AIDS because it is not made from other human serum.

SIGNATURE_____ DATE_____

B. Intramuscular Injection: I wish to receive the vaccine through intramuscular injection to reduce the likelihood of acquiring Hepatitis B. The injection is given in 1cc doses intramuscular on three separate occasions. I realize that I must get all three injections before I am considered immune. I understand that a blood test to tell if I have immunity is not routinely given or recommended after intramuscular vaccine, but I may obtain an immunity test through my own physician or resources. I agree to take the first injection before beginning any clinical assignment and to complete the process within six months. I agree to pay all costs associated with the vaccine.

SIGNATURE_____ DATE_____

Attachment B

COPIAH-LINCOLN COMMUNITY COLLEGE
RADIOGRAPHY PROGRAM
INCIDENT REPORT

PURPOSE: to provide an accurate record of any incident: campus or clinical, accident or error.

INSTRUCTIONS: this report is to be completed by any person making report of any incident involving a student in clinical or on campus. Incidents such as contrast errors, accidents, unethical behavior, violation of clinical facility policies, etc.

NATURE OF INCIDENT:

DATE OF OCCURANCE:

STUDENT (S) INVOLVED:

PERSON REPORTING INCIDENT:

NARRATIVE STATEMENT OF INCIDENT:

ACTIONS TAKEN:

FOLLOW-UP REPORT:

SIGNATURE (S):

Attachment C

MEDICAL Radiologic Technology

(For New Students Beginning Fall_____)

Student Name_____ **Address**_____ **AC T**_____

SS#_____ **Date of Birth**_____ **Phone**_____ **E-Mail**_____

FRESHMAN YEAR

Summer Term

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
BIO 2513	Anatomy & Physiology I	3			
BIO 2511	Anatomy & Physiology I Lab	1			
BIO 2523	Anatomy & Physiology II	3			
BIO 2521	Anatomy & Physiology II Lab	1			
ENG 1113	English Composition I	3			

11

1rst Semester

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
RGT 1114	Clinical Education I	4			
RGT 1212	Fundamentals of Radiography	2			
RGT 1312	Prin. of Radiation Protection	2			
RGT 1413	Imaging Principles	3			
RGT 1513	Radiographic Procedures I	3			
MAT 1313	College Algebra	3			

17

2nd Semester

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
RGT 1124	Clinical Education II	4			
RGT 1223	Patient Care in Radiography	3			
RGT 1423	Digital Imaging	3			
RGT 1523	Radiographic Procedures II	3			
SPT 1113	Public Speaking	3			

16

Summer Term

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
RGT 1139	Clinical Education III	9			

9

SOPHMORE YEAR

1ST Semester

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
RGT 1613	Physics of Imaging Equip.	3			
RGT 2132	Ethical and Legal Resp.	2			
RGT 2147	Clinical Education IV	7			
RGT 2533	Radiographic Proc. III	3			
	*Social /Behavioral Electives	3			

2nd Semester

Course No.	Course Name	Sem Hrs.	Semester	Grade	Date & Reason for Weithdrawal or Drop
RGT 2157	Clinical Ed. V	7			
RGT 2542	Radiographic Proc. IV	2			
RGT 2912	Radiation Biology	2			
RGT 2922	Radiographic Pathology	2			
RGT 2932	Certification Fundamentals	2			
	*Humanities/Fine Arts Elective				

*Program Advisor must approve Electives

I understand if I do not take courses in the sequence suggested by my advisor that I might not graduate on time.

1st Semester –Freshman Year

Student Signature_____Date_____Advisor_____

2nd Semester – Freshman

Student Signature_____Date_____Advisor_____

Summer Term

Student Signature_____Date_____Advisor_____

1st Semester Sophomore Year

Student Signature_____Date_____Advisor_____

2nd Semester Sophomore Year

Student Signature_____Date_____Advisor_____

Summer Term

Student Signature_____Date_____Advisor_____

ADDITIONAL COURSES NEEDED

FOR:_____

Course No.	Course Name	Sem Hrs.	Semester

Employer_____

Employer's Phone No_____Supervisor's Name_____

Attachment D

COPIAH-LINCOLN COMMUNITY COLLEGE
RADIOGRAPHY STUDENT
ADVISEMENT FORM

STUDENT: **DATE:**

Mid Term Grades

Clinical

Results of Conference

Student Signature **Instructor Signature**

_____ _____

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY
CLINICAL PERFORMANCE EVALUATION

STUDENT:_____AFFILIATE_____
INCLUSIVE DATES_____TO_____CLINICAL COURSE_____

NOTE: This evaluation is to be based on the student's level in the program.
Using the scale below circle the number that is most appropriate.

10	EXCELLENT	Performance consistently outstanding
8	SATISFACTORY	Performance at required level
5	NEEDS IMPROVEMENT	Performance below required level
0-1	POOR	Performance unacceptable

Demonstrates adequate positioning skills appropriate to program level.	10	8	5	1
Demonstrates accuracy in selecting and adjusting technical factors and proper protocols.	10	8	5	1
Demonstrates accuracy in critiquing radiographic images.	10	8	5	1
Speed of performance with respect to program level.	10	8	5	1
Recognizes the routines and requirements of examinations performed in the facility.	10	8	5	1
Relates to and anticipates the needs of doctors and technologists.	10	8	5	1
Performs paperwork and/or computer duties. Is able to assess patient records as needed.	10	8	5	1
Completes assigned tasks.	10	8	5	1
Operates equipment, and locates and uses accessories and supplies as needed.	10	8	5	1
Adjust to changes, unusual situations, patient conditions and deviations from the norm.	10	8	5	1
Uses adequate shielding and collimation. Checks pregnancy status of patients within childbearing age.	10	8	5	1
Dependability. Stays in assigned area & is quick to assist technologists & other healthcare workers.	10	8	5	1
Demonstrates effective communication skills by utilizing the AIDET framework (acknowledge, introduce, duration, explanation, thank you) when communicating with patients and their families.	10	8	5	1
Follows direct & indirect supervision policies as outlined in the MRT Student Handbook	10	8	5	1

PROFESSIONAL RESPOSIBILITY

Makes an effort to become involved: participates.	10	5	0
Asks questions at the appropriate time. Communicates well with patients, coworkers, and authority figures.	10	5	0
Wears the appropriate clinical attire adhering to program and hospital dress code.	10	5	0
Is consistently open to suggestions and demonstrates a desire to learn and achieve; accepts responsibility.	10	5	0
Responds well to constructive criticism; behaves in a responsible manner; uses good professional and ethical manners. Cooperates well with others.	10	5	0
Follows hospital and college policies.	10	5	0
Respects patient privacy.	10	5	0
Demonstrates punctuality.	10	5	0

**NOTIFY THE RADIOLOGY INSTRUCTOR IMMEDIATELY IF A STUDENT SCORES A 0, 1, OR 5.

Comments:

STUDENT SIGNATURE _____ DATE _____

CLINICAL INSTRUCTOR SIGNATURE _____ DATE _____

To Be Completed By The Program Instructor:

Grade from evaluation sheet:_____

Number	Attendance Evaluation	Points Subtracted
	Absences when department was notified x2	
	Absences when department wasn't notified x4	
	Tardies when department was notified x1	
	Tardies when department wasn't notified x2	

Grade for this evaluation period_____

Comments:

Signatures:

Student _____ Date _____ Program Instructor _____

Attachment F

COPIAH-LINCOLN COMMUNITY COLLEGE
RADIOGRAPHY STUDENT CONFERENCE FORM

STUDENT:_____ DATE:_____

CIRCLE ONE THEORY COURSE CLINICAL COURSE

CLINICAL AFFILIATE: _____

REASON FOR CONFERENCE:

RESULT OF CONFERENCE:

This report is being made a part of my Program Record. The purpose of this conference has been explained to me. My signature does not necessarily imply agreement.

_____ _____

STUDENT'S SIGNATURE INSTRUCTOR'S SIGNATURE

EQUIPMENT PROFICIENCY

NAME_____ DATE_____ ROOM#_____

EQUIPMENT_____ EVALUATOR_____

Standard: The evaluator will rate the student's competencies according to the following numbered rating scale:

10	Excellent (no mistakes)
9	Satisfactory (10% error)
5	Below Satisfactory (50% error)
2	Needs more assistance

With the designated equipment the student will:

	1. Manipulate mA settings.
	2. Manipulate exposure time settings.
	3. Manipulate kVp settings.
	4. Select focal spot size.
	5. Engage and disengage AEC.
	6. Adjust AEC density control.
	7. Select AEC field(s).
	8. Move x-ray tube.
	9. Adjust SID.
	10. Center to table bucky.
	11. Center to upright cassette holder.
	12. Use locks appropriately.
	13. Angle x-ray tube.
	14. Set control panel for fluoroscopic procedure.
	15. Set 5 minute timer.
	16. Position fluoro image intensifier.
	17. Turn on and adjust TV monitor.
	18. Insert and remove cassette from spot film device. Adjust film format.
	19. Insert and remove cassette from spot film device. Adjust film format.
	20. Move tabletop laterally and lengthwise.
	21. Move table to upright position.
	22. Move table to trendelenburg position.
	23. Attach and remove footboard.
	24. Set control panel for tomography.
	25. Adjust fulcrum level.
	26. Locate and use patient restraints and support devices.
	27. Locate and use auxiliary film support devices.

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY PROGRAM
CLINICAL PERFORMANCE SKILL EVALUATION FORM

STUDENT_____ **EXAM**_____
AFFILIATE_____ **DATE**_____
AEC_____ **kVp**_____ **mAs**_____

Scale: 10 - No mistakes 5-Needs improvement 0-Unacceptable
Directions: Using the scale above circle the number that is most appropriate.

	Points	Points	Points
1. Evaluate requisition/Room preparation	10	5	0
2. Follows pt. identification procedure	10	5	0
3. Selection of cassettes & accessories	10	5	0
4. Proper use of markers; pt identification	10	5	0
5. Correct CR location, angle & direction	10	5	0
6. Proper positioning	10	5	0
7. Proper SID; Compensated for angle of Tube, if applicable	10	5	0
8. Completed routine projections	10	5	0
9. Removed opaque objects	10	5	0
10. Gave patient proper care and Instructions; explained procedure	10	5	0
11. Moved tube & table with care, used locks.	10	5	0
12. Used adequate collimation and Shielding.	10	5	0
13. Set control panel independently and Correctly/set exam protocol	10	5	0
14. Adjusted for patient conditions	10	5	0
15. Technical quality of film adequate/ Within exposure index.	10	5	0
16. Completed procedure in a timely Manner.	10	5	0

Number of images repeated _____ **(There will be a 10 pt. deduction for each image that requires a repeat exposure.)**

Reason for repeat exposure _____

EVALUATOR _____ STUDENT _____ PT ACCESSION # _____

Attachment I

CLCC
TECHNOLOGIST OBSERVATION FORM

STUDENT_____ TECHNOLOGIST_____

DATE_____ PRIMARY AREA_____

YES	NO	SOMETIMES	
			The student demonstrates appropriate positioning skills according to their clinical level. Student is assertive and willing to learn procedures that have not been taught within the lab setting. Gets involved with all procedures, even the procedures in which they have no prior knowledge.
			Makes an effort to select the technical factors/proper protocol. Asks questions about technical factors, charts, and looks at technical factors on each and every exam.
			Demonstrates an accuracy in critiquing finished images. Recognizes density and contrast and recognizes the use of each within the image. Knows anatomy & positioning and is able to verify correctness on the finished image.
			Adequate speed; constantly aware of speed and makes an effort to improve
			Makes an effort to recognize the routines and requirements of examinations being performed. The student asks questions about the projections utilized and supplies needed. Student takes notes about routines and technical factors.
			Ability to relate to and anticipate the needs of doctors and technologists. Student recognizes when others need assistance with patients or supplies are needed. Understands directions.
			Ability to perform paperwork and/or computer duties. Student completes & closes out exams.
			Is able to correctly use the computer system including CR/DR and PACS. Asks appropriate questions and makes an effort to learn the system.
			Completes assigned tasks. Does not leave things unfinished.
			Ability to use locks and move equipment with ease. This is related to the tube in relation to the chest rack, tube, & table. The student is able to work with the equipment & supplies confidently.
			Ability to adjust to changes, unusual situations, patient conditions and deviations from the norm. Student is not intimidated by the uncooperative, sick, physically handicapped, or traumatized pt. Student is aware of when to assist and when to step back. Uses good judgment.
			Uses proper collimation and shielding; student does not open collimator light larger than IR size. He/she wears lead apron, stands out of the direct beam, shields patients, and provides aprons for those in the room.
			Remains in assigned areas, takes appropriate breaks, has good attendance.
			Makes an effort to become involved. Does not stand back. Asks questions and gets involved in some capacity in every exam.
			Asks appropriate questions and asks them at the appropriate time. Communicates well with patients and co-workers. Asks relevant questions.
			Appears well groomed and uniforms are appropriate, neat and clean. Adheres to CLCC and hospital dress code. Excessive jewelry is not worn; tattoos are covered.
			Accepts responsibility with respect to his/her program level. Is consistently open to suggestions. Good attitude and desire to learn.
			Responds well to constructive criticism; behaves in a responsible & respectful manner; uses good professional & ethical judgment; cooperates & works well with others
			Follows hospital & college policies
			Respects patient privacy & modesty; practices patient confidentiality; only discusses patient information with direct caregivers
			Demonstrates punctuality; is in work area on time and returns from lunch and breaks on time

COMMENTS:_____

_____

_____

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_____

_____

SIGNATURE_____

FINAL COMPETENCY EVALUATION CATEGORIES

UPPER EXTREMITIES	DATE & CI INITIALS	CRANIUM	DATE & CI INITIALS
Digit/thumb		skull	
Wrist		Facial bones	
Hand		Nasal bones	
Forearm		sinuses	
Humerus		TMJ's	
shoulder		mandible	
Clavicle		Zygomatic arches	
Scapula		Optic foramen	
Elbow			
LOWER EXTREMITIES		**CONTRAST PROCEDURES**	
Toes		Esophagram	
Foot		Gallbladder	
Ankle		Upper GI	
Knee		Small bowel series	
Patella		Barium enema	
Tib/fib		IVU (I VP)	
Calcaneus		Cystogram	
Femur		cholangiogram	
Hip			
pelvis			
THORAX, SPINE & ABDOMEN		**SPECIAL PROCEDURES**	
Chest		Venogram	
Abdomen		Arthrogram	
Cervical spine		Myelogram	
Thoracic spine		Hysterosalpingogram	
Lumbar spine		Portable radiography	
Ribs		Tomography	
sternum		Bronchogram	
Sacrum		CT head	
Coccyx			
SI joints			

Attachment K

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY PROGRAM
FINAL COMPETENCY EVALUATION FORM

STUDENT_____LEVEL____DATE_____

EVALUATOR_____EXAM_____

ACCESSION #(_____

This form is designed to evaluate procedures from the six Competency Evaluation Categories.

Excellent performance	10
Satisfactory performance/no repeats	5
Unsatisfactory	0

1. requisition evaluation & room preparation	10	5	0
2. correctly identifies patient	10	5	0
3. patient care/ explanation	10	5	0
4. positioning skills	10	5	0
5. equipment manipulation	10	5	0
6. radiation protection	10	5	0
7. central ray location, angle, and direction	10	5	0
8. sets control panel correctly & independently;selects proper exam protocol	10	5	0
9. proper use of markers & pt identification	10	5	0
10. foreign body removal	10	5	0
IMAGE EVALUATION			
11. correctly identifies anatomical parts	10	5	0
12. able to correctly critique technical quality of images	10	5	0
13. able to correctly critique positioning	10	5	0
14. able to correctly identify projections	10	5	0
15. Number of repeats/reason			

_____ _____

Student Signature Date

Comments:_____

Attachment L

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY
EXIT EVALUATION

STUDENT'S NAME_____DATE_____
CLINICAL SITE_____
EVALUATOR_____

This is the final competency for the semester. Circle the score for each category. Five indicates a high score; 1 indicates a low score.

I. PATIENT CARE/CLINICAL ABILITY

A.TECHNICAL KNOWLEDGE	1	2	3	4	5
B. ATTITUDE	1	2	3	4	5
C. QUALITY OF WORK	1	2	3	4	5
D. COMMUNICATION SKILLS	1	2	3	4	5
E. CRITICAL THINKING SKILLS/ABILITY TO ADJUST	1	2	3	4	5

II. OVERALL RATING

IS THIS STUDENT PREPARED TO WORK AS A RADIOLOGIC TECHNOLOGIST?	1	2	3	4	5

COMMENTS:

_____
_____
_____
_____
_____
_____
_____
_____
_____

_____ _____
EVALUATOR'S SIGNATURE DATE

Attachment M

COPIAH-LINCOLN COMMUNITY COLLEGE

MEDICAL RADIOLOGIC TECHNOLOGY
VENIPUNCTURE COMPETENCY EVALUATION

STUDENT NAME_____

AFFILIATE_____DATE_____

Scale: 10 - No mistakes 5 – Needs improvement
3 – unacceptable 0 – no performance

Directions: This competency is for second year students. Using the scale above circle the number that is most appropriate .

Evaluates patient request, chart or other pertinent information	10	5	3	0
Asks patient appropriate questions and completes paperwork	10	5	3	0
Prepares room/supplies	10	5	3	0
Draws up contrast properly				
Gives patient proper care and instructions.	10	5	3	0
Properly preps site				
Appropriate placement of tourniquet	10	5	3	0
Adjusts for patient conditions				
Maintains sterile environment	10	5	3	0
Uses appropriate supplies	10	5	3	0
Awareness of emergency drugs and codes	10	5	3	0
Proper insertion of catheter or needle	10	5	3	0
Proper disposal of supplies	10	5	3	0

_____ _____
Student Signature Technologist Signature

_____Date

COMMENTS_____
_____
_____
_____

ATTACHMENT N

COPIAH-LINCOLN COMMUNITY COLLEGE
MEDICAL RADIOLOGIC TECHNOLOGY

REPEAT EXAM DOCUMENTATION SHEET

STUDENT NAME_____SEMESTER_____

EXAM	ACCESSION #	REASON FOR REPEAT	DATE	TECHNOLOGIST INITIALS

STUDENT NAME_____ **SEMESTER**_____

EXAM	ACCESSION #	REASON FOR REPEAT	DATE	TECHNOLOGIST INITIALS

Attachment O

COPIAH LINCOLN COMMUNITY COLLEGE — Radiologic Technology

COVID-19 CLINICAL STUDENT WAIVER AND RELEASE FORM

The healthcare environment poses a wide range of hazards including but not limited to exposure to communicable diseases. Due to the COVID-19 pandemic, CLCC wants to ensure that all clinical students are fully informed about the current role of clinical sites and healthcare facilities during the pandemic and its treatment of COVID-19 patients. Healthcare facilities are following all precautions and taking measures to prevent the spread of COVID-19 in its facilities including establishing policies and procedures that apply to the employees and the clinical students assigned to the facility.

By signing this waiver and release I am acknowledging that I understand that these facilities are treating patients with the COVID-19 virus and I may be required to x-ray a patient that is COVID-19 positive or potentially positive for COVID-19. I understand that by accepting my clinical assignments, there is a risk of contracting COVID-19.

I hereby release, waive and/or hold harmless Copiah-Lincoln Community College, clinical sites, their representatives, administration, instructors, agents, directors and/or trustees from all claims or liability for damages and/or injuries, including death, incurred by me related to exposure to and contracting COVID-19 or other communicable disease treated at facility, irrespective of cause or origin of such exposure. I further acknowledge that I have reviewed and evaluated the risks and hereby agree to proceed with the clinical education.

_____ _____

Student Signature Date

_____ _____

Clinical Coordinator Date

Covid-19 Guidelines for Medical Radiologic Technology Students

- Students must check his/her temperature prior to entering the facility. If temperature exceeds 99.0, the student should contact the Clinical Instructor/Preceptor and the Clinical Coordinator for instructions.
- Students should self- monitor for sore throat, shortness of breath, body aches, and congestion. If the student experiences any of these symptoms he/she should contact the Clinical Instructor/Preceptor and the Clinical Coordinator for instructions.
- Students must wear a clean surgical mask into the facility daily.
- Students should wash hands often with soap and water for at least 20 seconds.
- Students are to use alcohol- based hand sanitizer before and after every patient contact.
- Students are to avoid touching his/her eyes, nose, and mouth with unwashed hands.
- Students are to wear an N-95 mask when x-raying any patient that is COVID 19 positive or potentially positive for COVID 19. If a properly fitting N-95 is not available, the student will not be allowed to participate in the exam.
- If a student has a health condition that contraindicates him/her wearing an N-95 mask, he/she will not be allowed to x-ray a patient that is COVID 19 positive or potentially positive for COVID 19.
- Students will be required to follow policies of the clinical site where assigned at all times.
- Students will be required to sign a waiver stating that clinical facilities nor Copiah-Lincoln Community College can be held responsible for any type of disease or infection that may be contracted during their clinical rotations.

By signing, student acknowledges that he/she understands and will comply with stated guidelines. By signing, the student also consents to addendums and additions to the above guidelines.

Student Signature_____ Date _____

Clinical Coordinator Signature_____

Statement on Immunizations Forms and Vaccines

Clinical experiences are a significant part of the educational process of those in the MRT program. In order to successfully progress through programmatic curriculum, the timely completion of clinical rotations is critical. **To start a clinical rotation, all students are required to sign and date the "Statement on Immunizations Form"**, demonstrating agreement to the stipulations outlined. Once this form is completed, it is to be submitted to the Program Director for verification prior to going to the assigned clinical environment.

While Co-Lin does not require that all students are vaccinated in order to be admitted into a restricted admissions health program, **vaccinations may be required by our clinical facility affiliates in order for our students to enter and participate at these facilities.** Students enrolled in the MRT program and progressing to Clinical Practice I, II, III, IV, & V at a clinical affiliate will need to provide proof of vaccination to the affiliate prior to attending clinical rotations.

COPIAH-LINCOLN COMMUNITY COLLEGE MRT PROGRAM
STATEMENT ON IMMUNIZATIONS

Copiah-Lincoln Community College ("Co-Lin") recognizes the individual rights to self-determination and decision making for all individuals with regard to public health vaccination recommendations. Co-Lin strongly supports immunizations to protect the public from highly communicable and deadly diseases such as measles, mumps, diphtheria, pertussis, influenza and the coronavirus (COVID 19) for its students and employees. Effective protection of the public health mandates that all individuals receive immunizations against vaccine-preventable diseases according to the best and most current evidence outlined by the Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP). All medical radiologic technology program students should be vaccinated according to current recommendations for immunization by the CDC and Association for Professionals in Infection Control and Epidemiology (APIC).

While Co-Lin does not require that all medical radiologic technology students are vaccinated in order to be admitted into a restricted admissions health program, **vaccinations may be required by our clinical facility affiliates in order for our students to enter and participate at these facilities**. A clinical facility's decision to mandate vaccinations is independent of Co-Lin. Co-Lin faculty and students must comply with the vaccination policies required by our partner clinical agencies. If a student refuses to comply with a facility's vaccination requirement, Co-Lin will attempt, but cannot guarantee, to place a student into an alternate facility that is currently engaged in an affiliation agreement with the MRT program at Co-Lin. A student will only be placed in the alternate affiliate if there is availability for student placement, and the clinical affiliate agrees to accept the student. Refusal to comply with a facility's vaccination requirement by a student in our MRT program may impede your progress in the program, including the delay of or prevention of program completion, or your ability to remain in the program (dismissal).

Your signature on this document acknowledges that you have read and understand that by coming into this program you may be required to complete the clinical experiences in facilities that mandate vaccination. If you choose to not receive vaccinations required by the clinical facilities, the following could occur:

- You may be able to be placed at another clinical affiliate currently engaged in an affiliation agreement with the MRT program at Co-Lin; or

Attachment Q

Ethics Form
MSRT Conference

By signing this agreement form, you agree to the behaviors and expectations listed below. Each of these expectations have been discussed with you.

Please read and initial by the following statements to confirm that you have read and understand each expectation:

_____ You are to be respectful and behave in a responsible and ethical manner while at the MSRT conference.

_____ You are only allowed to miss 2 meetings while at the conference.

_____ You are required to attend the prep bowl, be on time to meetings (no sleeping in meeting), get your meeting form signed after each meeting, and no disrespectful behavior during the meetings (i.e., being disruptive, sleeping, talking, having air pods in, etc.).

_____ You are to stay from Tuesday - Friday (leave Friday morning).

_____ You are to leave the hotel the way you found it and not destroy public property. No disruptive or rowdy behavior.

_____ The same dress code still applies at conference.

_____ Any inappropriate, illegal, or unethical behavior could lead to dismissal of the program.

_____ _____

Signature Date

Attachment R

Co-Lin Radiology
Community Service
Verification Form

Serving your community through a work project can be the most rewarding way to give back to those who have helped you. You will be required to complete at least 1 service project each semester. You will receive a grade each semester for your project.

If you have participated in a service project, please complete the information below and have it signed off on by the person who supervised you. Once it's complete, please submit this form to your instructor in order for it to be tracked for recognition.

Date of Service	Name of Organization	Type of Work Completed	Hours Worked	Verifying Signature(Print Name & Sign)

(Turn over to record additional)

Total Projects Completed: _____

I certify that I have completed the above listed hours as a community service project.

_____ _____ _____

Print Name Signature Date

****

For Office Use Only:

Total Projects: _____ Date Entered: _____ Initials: _____

JRC ERT STANDARDS

The Radiography Program is accredited by the Joint Review Committee on Education in Radiologic Technology. Maintaining this accreditation is necessary in order for the students to be able to take the registry exam administered by the American Registry of Radiologic Technologists.

On the following pages the student will find a copy of the "Standards" of an Accredited Educational Program for the Radiographer. These are the minimum requirements for receiving accreditation by the JRC-ERT. Any student with questions on how the "Standards" are met should discuss these with the Program Director.

Standards for an Accredited Educational Program in Radiography

Effective January 1, 2021

Adopted April 2020

JRCERT

Excellence in Education

Standard One: Accountability, Fair Practices, and Public Information

The sponsoring institution and program promote accountability and fair practices in relation to students, faculty, and the public. Policies and procedures of the sponsoring institution and program must support the rights of students and faculty, be well-defined, written, and readily available.

Objectives:

1.1 The sponsoring institution and program provide students, faculty, and the public with policies, procedures, and relevant information. Policies and procedures must be fair, equitably applied, and readily available.

1.2 The sponsoring institution and program have faculty recruitment and employment practices that are nondiscriminatory.

1.3 The sponsoring institution and program have student recruitment and admission practices that are nondiscriminatory and consistent with published policies.

1.4 The program assures the confidentiality of student educational records.

1.5 The program assures that students and faculty are made aware of the JRCERT **Standards for an Accredited Educational Program in Radiography** and the avenue to pursue allegations of noncompliance with the **Standards**.

1.6 The program publishes program effectiveness data (credentialing examination pass rate, job placement rate, and program completion rate) on an annual basis.

1.7 The sponsoring institution and program comply with the requirements to achieve and maintain JRCERT accreditation.

Standard Two: Institutional Commitment and Resources

The sponsoring institution demonstrates a sound financial commitment to the program by assuring sufficient academic, fiscal, personnel, and physical resources to achieve the program's mission.

Objectives:

2.1 The sponsoring institution provides appropriate administrative support and demonstrates a sound financial commitment to the program.

2.2 The sponsoring institution provides the program with the physical resources needed to support the achievement of the program's mission.

2.3 The sponsoring institution provides student resources.

2.4 The sponsoring institution and program maintain compliance with United States Department of Education (USDE) Title IV financial aid policies and procedures, if the JRCERT serves as gatekeeper.

Standard Three: Faculty and Staff

The sponsoring institution provides the program adequate and qualified faculty that enable the program to meet its mission and promote student learning.

Objectives:

3.1 The sponsoring institution provides an adequate number of faculty to meet all educational, accreditation, and administrative requirements.

3.2 The sponsoring institution and program assure that all faculty and staff possess the academic and professional qualifications appropriate for their assignments.

3.3 The sponsoring institution and program assure the responsibilities of faculty and clinical staff are delineated and performed.

3.4 The sponsoring institution and program assure program faculty performance is evaluated and results are shared regularly to assure responsibilities are performed.

3.5 The sponsoring institution and/or program provide faculty with opportunities for continued professional development.

Standard Four: Curriculum and Academic Practices

The program's curriculum and academic practices prepare students for professional practice.

Objectives:

4.1 The program has a mission statement that defines its purpose.

4.2 The program provides a well-structured curriculum that prepares students to practice in the professional discipline.

4.3 All clinical settings must be recognized by the JRCERT.

4.4 The program provides timely, equitable, and educationally valid clinical experiences for all students.

4.5 The program provides learning opportunities in advanced imaging and/or therapeutic technologies.

4.6 The program assures an appropriate relationship between program length and the subject matter taught for the terminal award offered.

4.7 The program measures didactic, laboratory, and clinical courses in clock hours and/or credit hours through the use of a consistent formula.

4.8 The program provides timely and supportive academic and clinical advisement to students enrolled in the program.

4.9 The program has procedures for maintaining the integrity of distance education courses.

Standard Five: Health and Safety

The sponsoring institution and program have policies and procedures that promote the health, safety, and optimal use of radiation for students, patients, and the public.

Objectives:

5.1 The program assures the radiation safety of students through the implementation of published policies and procedures.

5.2 The program assures each energized laboratory is in compliance with applicable state and/or federal radiation safety laws.

5.3 The program assures that students employ proper safety practices.

5.4 The program assures that medical imaging procedures are performed under the appropriate supervision of a qualified radiographer.

5.5 The sponsoring institution and/or program have policies and procedures that safeguard the health and safety of students.

Standard Six: Programmatic Effectiveness and Assessment: Using Data for Sustained Improvement

The extent of a program's effectiveness is linked to the ability to meet its mission, goals, and student learning outcomes. A systematic, ongoing assessment process provides credible evidence that enables analysis and critical discussions to foster ongoing program improvement.

Objectives:

6.1 The program maintains the following program effectiveness data:

- five-year average credentialing examination pass rate of not less than 75 percent at first attempt within six months of graduation,
- five-year average job placement rate of not less than 75 percent within twelve months of graduation, and
- annual program completion rate.

6.2 The program analyzes and shares its program effectiveness data to facilitate ongoing program improvement.

6.3 The program has a systematic assessment plan that facilitates ongoing program improvement.

6.4 The program analyzes and shares student learning outcome data to facilitate ongoing program improvement.

6.5 The program periodically reevaluates its assessment process to assure continuous program improvement.

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JRCERT

Excellence in Education

U.S. NUCLEAR REGULATORY GUIDE #8.13 **Appendix B**

The US Nuclear Regulatory Guide # 8.13 can be found on the following pages. This document contains instruction concerning prenatal radiation exposure. A form for declaring pregnancy can be found on page 65.

Revision 3
JUNE 1999

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.

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)

U.S. NUCLEAR REGULATORY GUIDE #8.29 **APPENDIX C**

A copy of the US Nuclear Regulatory Guide 8.29 can be found on the following pages. This guide gives instruction concerning risk from occupational radiation exposure.

U.S. NUCLEAR REGULATORY COMMISSION

Revision 1
February 1996

REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 8.29

(Draft was issued as DG-8012)

INSTRUCTION CONCERNING RISKS FROM OCCUPATIONAL RADIATION EXPOSURE

A. INTRODUCTION

Section 19.12 of 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," requires that all individuals who in the course of their employment are likely to receive in a year an occupational dose in excess of 100 mrem (1 mSv) be instructed in the health protection issues associated with exposure to radioactive materials or radiation. Section 20.1206 of 10 CFR Part 20, "Standards for Protection Against Radiation," requires that before a planned special exposure occurs the individuals involved are, among other things, to be informed of the estimated doses and associated risks.

This regulatory guide describes the information that should be provided to workers by licensees about health risks from occupational exposure. This revision conforms to the revision of 10 CFR Part 20 that became effective on June 20, 1991, to be implemented by licensees no later than January 1, 1994. The revision of 10 CFR Part 20 establishes new dose limits based on the effective dose equivalent (EDE), requires the summing of internal and external dose, establishes a requirement that licensees use procedures and engineering controls to the extent practicable to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA), provides for planned special exposures, establishes a dose limit for the embryo/fetus of an occupationally exposed declared pregnant woman, and explicitly states that Part 20 is not to be construed as limiting action that may be necessary to protect health and safety during emergencies.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Part 19 or 10 CFR Part 20. These regulations provide the regulatory bases for this guide. The information collection requirements in 10 CFR Parts 19 and 20 have been cleared under OMB Clearance Nos. 3150-0044 and 3150-0014, respectively.

B. DISCUSSION

It is important to qualify the material presented in this guide with the following considerations.

The coefficient used in this guide for occupational radiation risk estimates, 4×10^{-4} health effects per rem, is based on data obtained at much higher doses and dose rates than those encountered by workers. The risk coefficient obtained at high doses and dose rates was reduced to account for the reduced effectiveness of lower doses and dose rates in producing the stochastic effects observed in studies of exposed humans.

The assumption of a linear extrapolation from the lowest doses at which effects are observable down to

the occupational range has considerable uncertainty. The report of the Committee on the Biological Effects of Ionizing Radiation (Ref. 1) states that

> "... departure from linearity cannot be excluded at low doses below the range of observation. Such departures could be in the direction of either an increased or decreased risk. Moreover, epidemiologic data cannot rigorously exclude the existence of a threshold in the 100 mrem dose range. Thus, the possibility that there may be no risk from exposures comparable to external natural background radiation cannot be ruled out. At such low doses and dose rates, it must be acknowledged that the lower limit of the range of uncertainty in the risk estimates extends to zero."

The issue of beneficial effects from low doses, or hormesis, in cellular systems is addressed by the United Nations Scientific Committee on the Effects of Atomic Radiation (Ref. 2). UNSCEAR states that "... it would be premature to conclude that cellular adaptive responses could convey possible beneficial effects to the organism that would outweigh the detrimental effects of exposures to low doses of low-LET radiation."

In the absence of scientific certainty regarding the relationship between low doses and health effects, and as a conservative assumption for radiation protection purposes, the scientific community generally assumes that any exposure to ionizing radiation can cause biological effects that may be harmful to the exposed person and that the magnitude or probability of these effects is directly proportional to the dose. These effects may be classified into three categories:

> *Somatic Effects:* Physical effects occurring in the exposed person. These effects may be observable after a large or acute dose (e.g., 100 rems[1] (1 Sv) or more to the whole body in a few hours); or they may be effects such as cancer that may occur years after exposure to radiation.
>
> *Genetic Effects:* Abnormalities that may occur in the future children of exposed individuals and in subsequent generations (genetic effects exceeding normal incidence have not been observed in any of the studies of human populations).
>
> *Teratogenic Effects:* Effects such as cancer or congenital malformation that may be observed in children who were exposed during the fetal and embryonic stages of development (these effects have been observed from high, i.e., above 20 rems (0.2 Sv), acute exposures).

The normal incidence of effects from natural and manmade causes is significant. For example, approximately 20% of people die from various forms of cancer whether or not they ever receive occupational exposure to radiation. To avoid increasing the incidence of such biological effects, regulatory controls are imposed on occupational doses to adults and minors and on doses to the embryo/fetus from occupational exposures of declared pregnant women.

Radiation protection training for workers who are occupationally exposed to ionizing radiation is an essential component of any program designed to ensure compliance with NRC regulations. A clear understanding of what is presently known about the biological risks associated with exposure to radiation will result in more effective radiation protection training and should generate more interest on the part of the workers in complying with radiation protection standards. In addition, pregnant women and other occupationally exposed workers should have available to them relevant information on radiation risks to enable them to make informed decisions regarding the acceptance of these risks. It is intended that workers who receive this instruction will develop respect for the risks involved, rather than excessive fear or indifference.

C. REGULATORY POSITION

Instruction to workers performed in compliance with 10 CFR 19.12 should be given prior to occupational exposure and periodically thereafter. The frequency of retraining might range from annually for licensees with complex operations such as nuclear power plants, to every three years for licensees who possess, for example, only low-activity sealed sources. If a worker is to participate in a planned special exposure, the worker should be informed of the associated risks in compliance with 10 CFR 20.1206.

In providing instruction concerning health protection problems associated with exposure to radiation, all occupationally exposed workers and their supervisors should be given specific instruction on the risk of biological effects resulting from exposure to radiation. The extent of these instructions should be commensurate with the radiological risks present in the workplace.

The instruction should be presented orally, in printed form, or in any other effective communication media to workers and supervisors. The appendix to this guide provides useful information for demonstrating compliance with the training requirements in 10 CFR Parts 19 and 20. Individuals should be given an opportunity to discuss the information and to ask questions. Testing is recommended, and each trainee should be asked to acknowledge in writing that the instruction has been received and understood.

[1] In the International System of Units (SI), the rem is replaced by the sievert; 100 rems is equal to 1 sievert (Sv).

D. IMPLEMENTATION

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

Except in those cases in which an applicant or licensee proposes acceptable alternative methods for complying with specified portions of the Commission's regulations, the guidance and instructional materials in this guide will be used in the evaluation of applications for new licenses, license renewals, and license amendments and for evaluating compliance with 10 CFR 19.12 and 10 CFR Part 20.

REFERENCES

1. National Research Council, *Health Effects of Exposure to Low Levels of Ionizing Radiation*, Report of the Committee on the Biological Effects of Ionizing Radiation (BEIR V), National Academy Press, Washington, DC, 1990.

2. United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), *Sources and Effects of Ionizing Radiation*, United Nations, New York, 1993.

APPENDIX

INSTRUCTION CONCERNING RISKS FROM OCCUPATIONAL RADIATION EXPOSURE

This instructional material is intended to provide the user with the best available information about the health risks from occupational exposure to ionizing radiation. Ionizing radiation consists of energy or small particles, such as gamma rays and beta and alpha particles, emitted from radioactive materials, which can cause chemical or physical damage when they deposit energy in living tissue. A question and answer format is used. Many of the questions or subjects were developed by the NRC staff in consultation with workers, union representatives, and licensee representatives experienced in radiation protection training.

This Revision 1 to Regulatory Guide 8.29 updates the material in the original guide on biological effects and risks and on typical occupational exposure. Additionally, it conforms to the revised 10 CFR Part 20, "Standards for Protection Against Radiation," which was required to be implemented by licensees no later than January 1, 1994. The information in this appendix is intended to help develop respect by workers for the risks associated with radiation, rather than unjustified fear or lack of concern. Additional guidance concerning other topics in radiation protection training is provided in other NRC regulatory guides.

1. What is meant by health risk?

A health risk is generally thought of as something that may endanger health. Scientists consider health risk to be the statistical probability or mathematical chance that personal injury, illness, or death may result from some action. Most people do not think about health risks in terms of mathematics. Instead, most of us consider the health risk of a particular action in terms of whether we believe that particular action will, or will not, cause us some harm. The intent of this appendix is to provide estimates of, and explain the bases for, the risk of injury, illness, or death from occupational radiation exposure. Risk can be quantified in terms of the probability of a health effect per unit of dose received.

When x-rays, gamma rays, and ionizing particles interact with living materials such as our bodies, they may deposit enough energy to cause biological damage. Radiation can cause several different types of events such as the very small physical displacement of molecules, changing a molecule to a different form, or ionization, which is the removal of electrons from atoms and molecules. When the quantity of radiation energy deposited in living tissue is high enough, biological damage can occur as a result of chemical bonds being broken and cells being damaged or killed. These effects can result in observable clinical symptoms.

The basic unit for measuring absorbed radiation is the rad. One rad (0.01 gray in the International System of units) equals the absorption of 100 ergs (a small but measurable amount of energy) in a gram of material such as tissue exposed to radiation. To reflect biological risk, rads must be converted to rems. The new international unit is the sievert (100 rems = 1 Sv). This conversion accounts for the differences in the effectiveness of different types of radiation in causing damage. The rem is used to estimate biological risk. For beta and gamma radiation, a rem is considered equal to a rad.

2. What are the possible health effects of exposure to radiation?

Health effects from exposure to radiation range from no effect at all to death, including diseases such as leukemia or bone, breast, and lung cancer. Very high (100s of rads), short-term doses of radiation have been known to cause prompt (or early) effects, such as vomiting and diarrhea,[1] skin burns, cataracts, and even death. It is suspected that radiation exposure may be linked to the potential for genetic effects in the children of exposed parents. Also, children who were exposed to high doses (20 or more rads) of radiation prior to birth (as an embryo/fetus) have shown an increased risk of mental retardation and other congenital malformations. These effects (with the exception of genetic effects) have been observed in various studies of medical radiologists, uranium miners, radium workers, radiotherapy patients, and the people exposed to radiation from atomic bombs dropped on Japan. In addition, radiation effects studies with laboratory animals, in which the animals were given relatively high doses, have provided extensive data on radiation-induced health effects, including genetic effects.

It is important to note that these kinds of health effects result from high doses, compared to occupational levels, delivered over a relatively short period of time.

Although studies have not shown a consistent cause-and-effect relationship between current levels of occupational radiation exposure and biological effects, it is prudent from a worker protection perspective to assume that some effects may occur.

[1] These symptoms are early indicators of what is referred to as the acute radiation syndrome, caused by high doses delivered over a short time period, which includes damage to the blood-forming organs such as bone marrow, damage to the gastrointestinal system, and, at very high doses, can include damage to the central nervous system.

3. What is meant by early effects and delayed or late effects?

EARLY EFFECTS

Early effects, which are also called immediate or prompt effects, are those that occur shortly after a large exposure that is delivered within hours to a few days. They are observable after receiving a very large dose in a short period of time, for example, 300 rads (3 Gy) received within a few minutes to a few days. Early effects are not caused at the levels of radiation exposure allowed under the NRC's occupational limits.

Early effects occur when the radiation dose is large enough to cause extensive biological damage to cells so that large numbers of cells are killed. For early effects to occur, this radiation dose must be received within a short time period. This type of dose is called an acute dose or acute exposure. The same dose received over a long time period would not cause the same effect. Our body's natural biological processes are constantly repairing damaged cells and replacing dead cells; if the cell damage is spread over time, our body is capable of repairing or replacing some of the damaged cells, reducing the observable adverse conditions.

For example, a dose to the whole body of about 300–500 rads (3–5 Gy), more than 60 times the annual occupational dose limit, if received within a short time period (e.g., a few hours) will cause vomiting and diarrhea within a few hours; loss of hair, fever, and weight loss within a few weeks; and about a 50 percent chance of death if medical treatment is not provided. These effects would not occur if the same dose were accumulated gradually over many weeks or months (Refs. 1 and 2). Thus, one of the justifications for establishing annual dose limits is to ensure that occupational dose is spread out in time.

It is important to distinguish between whole body and partial body exposure. A localized dose to a small volume of the body would not produce the same effect as a whole body dose of the same magnitude. For example, if only the hand were exposed, the effect would mainly be limited to the skin and underlying tissue of the hand. An acute dose of 400 to 600 rads (4–6 Gy) to the hand would cause skin reddening; recovery would occur over the following months and no long-term damage would be expected. An acute dose of this magnitude to the whole body could cause death within a short time without medical treatment. Medical treatment would lessen the magnitude of the effects and the chance of death; however, it would not totally eliminate the effects or the chance of death.

DELAYED EFFECTS

Delayed effects may occur years after exposure. These effects are caused indirectly when the radiation changes parts of the cells in the body, which causes the normal function of the cell to change, for example, normal healthy cells turn into cancer cells. The potential for these delayed health effects is one of the main concerns addressed when setting limits on occupational doses.

A delayed effect of special interest is genetic effects. Genetic effects may occur if there is radiation damage to the cells of the gonads (sperm or eggs). These effects may show up as genetic defects in the children of the exposed individual and succeeding generations. However, if any genetic effects (i.e., effects in addition to the normal expected number) have been caused by radiation, the numbers are too small to have been observed in human populations exposed to radiation. For example, the atomic bomb survivors (from Hiroshima and Nagasaki) have not shown any significant radiation-related increases in genetic defects (Ref. 3). Effects have been observed in animal studies conducted at very high levels of exposure and it is known that radiation can cause changes in the genes in cells of the human body. However, it is believed that by maintaining worker exposures below the NRC limits and consistent with ALARA, a margin of safety is provided such that the risk of genetic effects is almost eliminated.

4. What is the difference between acute and chronic radiation dose?

Acute radiation dose usually refers to a large dose of radiation received in a short period of time. Chronic dose refers to the sum of small doses received repeatedly over long time periods, for example, 20 mrem (or millirem, which is 1-thousandth of a rem) (0.2 mSv) per week every week for several years. It is assumed for radiation protection purposes that any radiation dose, either acute or chronic, may cause delayed effects. However, only large acute doses cause early effects; chronic doses within the occupational dose limits do not cause early effects. Since the NRC limits do not permit large acute doses, concern with occupational radiation risk is primarily focused on controlling chronic exposure for which possible delayed effects, such as cancer, are of concern.

The difference between acute and chronic radiation exposure can be shown by using exposure to the sun's rays as an example. An intense exposure to the sun can result in painful burning, peeling, and growing of new skin. However, repeated short exposures provide time for the skin to be repaired between exposures. Whether exposure to the sun's rays is long term or spread over short periods, some of the injury may not be repaired and may eventually result in skin cancer.

Cataracts are an interesting case because they can be caused by both acute and chronic radiation. A certain threshold level of dose to the lens of the eye is required before there is any observable visual impairment, and the impairment remains after the exposure is stopped. The threshold for cataract development

from acute exposure is an acute dose on the order of 100 rads (1 Gy). Further, a cumulative dose of 800 rads (8 Gy) from protracted exposures over many years to the lens of the eye has been linked to some level of visual impairment (Refs. 1 and 4). These doses exceed the amount that may be accumulated by the lens from normal occupational exposure under the current regulations.

5. What is meant by external and internal exposure?

A worker's occupational dose may be caused by exposure to radiation that originates outside the body, called "external exposure," or by exposure to radiation from radioactive material that has been taken into the body, called "internal exposure." Most NRC-licensed activities involve little, if any, internal exposure. It is the current scientific consensus that a rem of radiation dose has the same biological risk regardless of whether it is from an external or an internal source. The NRC requires that dose from external exposure and dose from internal exposure be added together, if each exceeds 10% of the annual limit, and that the total be within occupational limits. The sum of external and internal dose is called the total effective dose equivalent (TEDE) and is expressed in units of rems (Sv).

Although unlikely, radioactive materials may enter the body through breathing, eating, drinking, or open wounds, or they may be absorbed through the skin. The intake of radioactive materials by workers is generally due to breathing contaminated air. Radioactive materials may be present as fine dust or gases in the workplace atmosphere. The surfaces of equipment and workbenches may be contaminated, and these materials can be resuspended in air during work activities.

If any radioactive material enters the body, the material goes to various organs or is excreted, depending on the biochemistry of the material. Most radioisotopes are excreted from the body in a few days. For example, a fraction of any uranium taken into the body will deposit in the bones, where it remains for a longer time. Uranium is slowly eliminated from the body, mostly by way of the kidneys. Most workers are not exposed to uranium. Radioactive iodine is preferentially deposited in the thyroid gland, which is located in the neck.

To limit risk to specific organs and the total body, an annual limit on intake (ALI) has been established for each radionuclide. When more than one radionuclide is involved, the intake amount of each radionuclide is reduced proportionally. NRC regulations specify the concentrations of radioactive material in the air to which a worker may be exposed for 2,000 working hours in a year. These concentrations are termed the derived air concentrations (DACs). These limits are the total amounts allowed if no external radiation is received. The resulting dose from the internal radiation sources (from breathing air at 1 DAC) is the maximum allowed to an organ or to the worker's whole body.

6. How does radiation cause cancer?

The mechanisms of radiation-induced cancer are not completely understood. When radiation interacts with the cells of our bodies, a number of events can occur. The damaged cells can repair themselves and permanent damage is not caused. The cells can die, much like the large numbers of cells that die every day in our bodies, and be replaced through the normal biological processes. Or a change can occur in the cell's reproductive structure, the cells can mutate and subsequently be repaired without effect, or they can form precancerous cells, which may become cancerous. Radiation is only one of many agents with the potential for causing cancer, and cancer caused by radiation cannot be distinguished from cancer attributable to any other cause.

Radiobiologists have studied the relationship between large doses of radiation and cancer (Refs. 5 and 6). These studies indicate that damage or change to genes in the cell nucleus is the main cause of radiation-induced cancer. This damage may occur directly through the interaction of the ionizing radiation in the cell or indirectly through the actions of chemical products produced by radiation interactions within cells. Cells are able to repair most damage within hours; however, some cells may not be repaired properly. Such misrepaired damage is thought to be the origin of cancer, but misrepair does not always cause cancer. Some cell changes are benign or the cell may die; these changes do not lead to cancer.

Many factors such as age, general health, inherited traits, sex, as well as exposure to other cancer-causing agents such as cigarette smoke can affect susceptibility to the cancer-causing effects of radiation. Many diseases are caused by the interaction of several factors, and these interactions appear to increase the susceptibility to cancer.

7. Who developed radiation risk estimates?

Radiation risk estimates were developed by several national and international scientific organizations over the last 40 years. These organizations include the National Academy of Sciences (which has issued several reports from the Committee on the Biological Effects of Ionizing Radiations, BEIR), the National Council on Radiation Protection and Measurements (NCRP), the International Commission on Radiological Protection (ICRP), and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). Each of these organizations continues to review new research findings on radiation health risks.

Several reports from these organizations present new findings on radiation risks based upon revised estimates of radiation dose to survivors of the atomic bombing at Hiroshima and Nagasaki. For example, UNSCEAR published risk estimates in 1988 and 1993 (Refs. 5 and 6). The NCRP also published a report in 1988, "New Dosimetry at Hiroshima and Nagasaki and Its Implications for Risk Estimates" (Ref. 7). In January 1990, the National Academy of Sciences released the fifth report of the BEIR Committee, "Health Effects of Exposure to Low Levels of Ionizing Radiation" (Ref. 4). Each of these publications also provides extensive bibliographies on other published studies concerning radiation health effects for those who may wish to read further on this subject.

8. What are the estimates of the risk of fatal cancer from radiation exposure?

We don't know exactly what the chances are of getting cancer from a low-level radiation dose, primarily because the few effects that may occur cannot be distinguished from normally occurring cancers. However, we can make estimates based on extrapolation from extensive knowledge from scientific research on high dose effects. The estimates of radiation effects at high doses are better known than are those of most chemical carcinogens (Ref. 8).

From currently available data, the NRC 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.

The radiation risk incurred by a worker depends on the amount of dose received. Under the linear model explained above, a worker who receives 5 rems (0.05 Sv) in a year incurs 10 times as much risk as another worker who receives only 0.5 rem (0.005 Sv). Only a very few workers receive doses near 5 rems (0.05 Sv) per year (Ref. 9).

According to the BEIR V report (Ref. 4), approximately one in five adults normally will die from cancer from all possible causes such as smoking, food, alcohol, drugs, air pollutants, natural background radiation, and inherited traits. Thus, in any group of 10,000 workers, we can estimate that about 2,000 (20%) will die from cancer without any occupational radiation exposure.

To explain the significance of these estimates, we will use as an example a group of 10,000 people, each exposed to 1 rem (0.01 Sv) of ionizing radiation. Using the risk factor of 4 effects per 10,000 rem of dose, we estimate that 4 of the 10,000 people might die from delayed cancer because of that 1-rem dose (although the actual number could be more or less than 4) in addition to the 2,000 normal cancer fatalities expected to occur in that group from all other causes. This means that a 1-rem (0.01 Sv) dose may increase an individual worker's chances of dying from cancer from 20 percent to 20.04 percent. If one's lifetime occupational dose is 10 rems, we could raise the estimate to 20.4 percent. A lifetime dose of 100 rems may increase chances of dying from cancer from 20 to 24 percent. The average measurable dose for radiation workers reported to the NRC was 0.31 rem (0.0031 Sv) for 1993 (Ref. 9). Today, very few workers ever accumulate 100 rems (1 Sv) in a working lifetime, and the average career dose of workers at NRC-licensed facilities is 1.5 rems (0.015 Sv), which represents an estimated increase from 20 to about 20.06 percent in the risk of dying from cancer.

It is important to understand the probability factors here. A similar question would be, "If you select one card from a full deck of cards, will you get the ace of spades?" This question cannot be answered with a simple yes or no. The best answer is that your chance is 1 in 52. However, if 1000 people each select one card from full decks, we can predict that about 20 of them will get an ace of spades. Each person will have 1 chance in 52 of drawing the ace of spades, but there is no way we can predict which persons will get that card. The issue is further complicated by the fact that in a drawing by 1000 people, we might get only 15 successes, and in another, perhaps 25 correct cards in 1000 draws. We can say that if you receive a radiation dose, you will have increased your chances of eventually developing cancer. It is assumed that the more radiation exposure you get, the more you increase your chances of cancer.

The normal chance of dying from cancer is about one in five for persons who have not received any occupational radiation dose. The additional chance of developing fatal cancer from an occupational exposure of 1 rem (0.01 Sv) is about the same as the chance of drawing any ace from a full deck of cards three times in a row. The additional chance of dying from cancer from an occupational exposure of 10 rem (0.1 Sv) is about equal to your chance of drawing two aces successively on the first two draws from a full deck of cards.

It is important to realize that these risk numbers are only estimates based on data for people and research animals exposed to high levels of radiation in short periods of time. There is still uncertainty with regard to estimates of radiation risk from low levels of exposure. Many difficulties are involved in designing research studies that can accurately measure the projected small increases in cancer cases that might be caused by low exposures to radiation as compared to the normal rate of cancer.

These estimates are considered by the NRC staff to be the best available for the worker to use to make an informed decision concerning acceptance of the risks associated with exposure to radiation. A worker who decides to accept this risk should try to keep exposure to radiation as low as is reasonably achievable (ALARA) to avoid unnecessary risk.

9. If I receive a radiation dose that is within occupational limits, will it cause me to get cancer?

Probably not. Based on the risk estimates previously discussed, the risk of cancer from doses below the occupational limits is believed to be small. Assessment of the cancer risks that may be associated with low doses of radiation are projected from data available at doses larger than 10 rems (0.1 Sv) (Ref. 3). For radiation protection purposes, these estimates are made using the straight line portion of the linear quadratic model (Curve 2 in Figure 1). We have data on cancer probabilities only for high doses, as shown by the solid line in Figure 1. Only in studies involving radiation doses above occupational limits are there dependable determinations of the risk of cancer, primarily because below the limits the effect is small compared to differences in the normal cancer incidence from year to year and place to place. The ICRP, NCRP, and other standards-setting organizations assume for radiation protection purposes that there is some risk, no matter how small the dose (Curves 1 and 2). Some scientists believe that the risk drops off to zero at some low dose (Curve 3), the threshold effect. The ICRP and NCRP endorse the linear quadratic model as a conservative means of assuring safety (Curve 2).

For regulatory purposes, the NRC uses the straight line portion of Curve 2, which shows the number of effects decreasing linearly as the dose decreases. Because the scientific evidence does not conclusively demonstrate whether there is or is not an effect at low doses, the NRC assumes for radiation protection purposes, that even small doses have some chance of causing cancer. Thus, a principle of radiation protection is to do more than merely meet the allowed regulatory limits; doses should be kept as low as is reasonably achievable (ALARA). This is as true for natural carcinogens such as sunlight and natural radiation as it is for those that are manmade, such as cigarette smoke, smog, and x-rays.

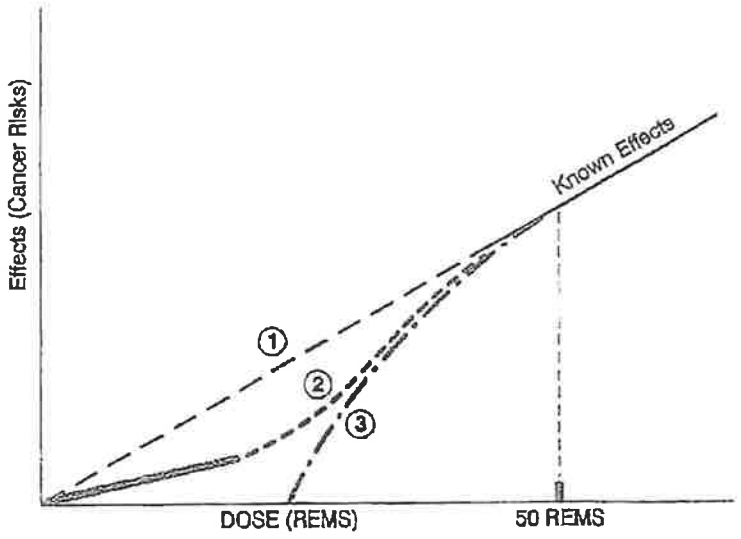

Figure 1. Some Proposed Models for How the Effects of Radiation Vary With Doses at Low Levels

10. How can we compare the risk of cancer from radiation to other kinds of health risks?

One way to make these comparisons is to compare the average number of days of life expectancy lost because of the effects associated with each particular health risk. Estimates are calculated by looking at a large number of persons, recording the age when death occurs from specific causes, and estimating the average number of days of life lost as a result of these early deaths. The total number of days of life lost is then averaged over the total observed group.

Several studies have compared the average days of life lost from exposure to radiation with the number of days lost as a result of being exposed to other health risks. The word "average" is important because an individual who gets cancer loses about 15 years of life expectancy, while his or her coworkers do not suffer any loss.

Some representative numbers are presented in Table 1. For categories of NRC-regulated industries with larger doses, the average measurable occupational dose in 1993 was 0.31 rem (0.0031 Sv). A simple calculation based on the article by Cohen and Lee (Ref. 10) shows that 0.3 rem (0.003 Sv) per year from age 18 to 65 results in an average loss of 15 days. These estimates indicate that the health risks from occupational radiation exposure are smaller than the risks associated with many other events or activities we encounter and accept in normal day-to-day activities.

It is also useful to compare the estimated average number of days of life lost from occupational exposure to radiation with the number of days lost as a result of working in several types of industries. Table 2 shows average days of life expectancy lost as a result of fatal work-related accidents. Table 2 does not include non-accident types of occupational risks such as occupational disease and stress because the data are not available.

These comparisons are not ideal because we are comparing the possible effects of chronic exposure to radiation to different kinds of risk such as accidental death, in which death is inevitable if the event occurs. This is the best we can do because good data are not available on chronic exposure to other workplace carcinogens. Also, the estimates of loss of life expectancy for workers from radiation-induced cancer do not take into consideration the competing effect on the life expectancy of the workers from industrial accidents.

11. What are the health risks from radiation exposure to the embryo/fetus?

During certain stages of development, the embryo/fetus is believed to be more sensitive to radiation damage than adults. Studies of atomic bomb survivors exposed to acute radiation doses exceeding 20 rads (0.2 Gy) during pregnancy show that children born after receiving these doses have a higher risk of mental retardation. Other studies suggest that an association exists between exposure to diagnostic x-rays before birth and carcinogenic effects in childhood and in adult life. Scientists are uncertain about the magnitude of the risk. Some studies show the embryo/fetus to be more sensitive to radiation-induced cancer than adults, but other studies do not. In recognition of the possibility of increased radiation sensitivity, and because dose to the

Table 1 Estimated Loss of Life Expectancy from Health Risks[a]

Health Risk	*Estimate of Life Expectancy Lost (average)*
Smoking 20 cigarettes a day	6 years
Overweight (by 15%)	2 years
Alcohol consumption (U.S. average)	1 year
All accidents combined	1 year
Motor vehicle accidents	207 days
Home accidents	74 days
Drowning	24 days
All natural hazards (earthquake, lightning, flood, etc.)	7 days
Medical radiation	6 days
Occupational Exposure	
0.3 rem/y from age 18 to 65	15 days
1 rem/y from age 18 to 65	51 days

[a]Adapted from Reference 10.

Table 2 Estimated Loss of Life Expectancy from Industrial Accidents[a]

Industry Type	*Estimated Days of Life Expectancy Lost (Average)*
All industries	60
Agriculture	320
Construction	227
Mining and Quarrying	167
Transportation and Public Utilities	160
Government	60
Manufacturing	40
Trade	27
Services	27

[a]Adapted from Reference 10.

embryo/fetus is involuntary on the part of the embryo/fetus, a more restrictive dose limit has been established for the embryo/fetus of a declared pregnant radiation worker. See Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure."

If an occupationally exposed woman declares her pregnancy in writing, she is subject to the more restrictive dose limits for the embryo/fetus during the remainder of the pregnancy. The dose limit of 500 mrems (5 mSv) for the total gestation period applies to the embryo/fetus and is controlled by restricting the exposure to the declared pregnant woman. Restricting the woman's occupational exposure, if she declares her pregnancy, raises questions about individual privacy rights, equal employment opportunities, and the possible loss of income. Because of these concerns, the declaration of pregnancy by a female radiation worker is voluntary. Also, the declaration of pregnancy can be withdrawn for any reason, for example, if the woman believes that her benefits from receiving the occupational exposure would outweigh the risk to her embryo/fetus from the radiation exposure.

12. Can a worker become sterile or impotent from normal occupational radiation exposure?

No. Temporary or permanent sterility cannot be caused by radiation at the levels allowed under NRC's occupational limits. There is a threshold below which these effects do not occur. Acute doses on the order of 10 rems (0.1 Sv) to the testes can result in a measurable but temporary reduction in sperm count. Temporary sterility (suppression of ovulation) has been observed in women who have received acute doses of 150 rads (1.5 Gy). The estimated threshold (acute) radiation dose for induction of permanent sterility is about 200 rads (2 Gy) for men and about 350 rads (3.5 Gy) for women (Refs. 1 and 4). These doses are far greater than the NRC s occupational dose limits for workers.

Although acute doses can affect fertility by reducing sperm count or suppressing ovulation, they do not have any direct effect on one's ability to function sexually. No evidence exists to suggest that exposures within the NRC's occupational limits have any effect on the ability to function sexually.

13. What are the NRC occupational dose limits?

For adults, an annual limit that does not exceed:

- 5 rems (0.05 Sv) for the total effective dose equivalent (TEDE), which is the sum of the deep dose equivalent (DDE) from external exposure to the whole body and the committed effective dose equivalent (CEDE) from intakes of radioactive material.
- 50 rems (0.5 Sv) for the total organ dose equivalent (TODE), which is the sum of the DDE from external exposure to the whole body and the committed dose equivalent (CDE) from intakes of radioactive material to any individual organ or tissue, other than the lens of the eye.
- 15 rems (0.15 Sv) for the lens dose equivalent (LDE), which is the external dose to the lens of the eye.
- 50 rems (0.5 Sv) for the shallow dose equivalent (SDE), which is the external dose to the skin or to any extremity.

For minor workers, the annual occupational dose limits are 10 percent of the dose limits for adult workers.

For protection of the embryo/fetus of a declared pregnant woman, the dose limit is 0.5 rem (5 mSv) during the entire pregnancy.

The occupational dose limit for adult workers of 5 rems (0.05 Sv) TEDE is based on consideration of the potential for delayed biological effects. The 5-rem (0.05 Sv) limit, together with application of the concept of keeping occupational doses ALARA, provides a level of risk of delayed effects considered acceptable by the NRC. The limits for individual organs are below the dose levels at which early biological effects are observed in the individual organs.

The dose limit for the embryo/fetus of a declared pregnant woman is based on a consideration of the possibility of greater sensitivity to radiation of the embryo/fetus and the involuntary nature of the exposure.

14. What is meant by ALARA?

ALARA means "as low as is reasonably achievable." In addition to providing an upper limit on an individual's permissible radiation dose, the NRC requires that its licensees establish radiation protection

programs and use procedures and engineering controls to achieve occupational doses, and doses to the public, as far below the limits as is reasonably achievable. "Reasonably achievable" also means "to the extent practicable." What is practicable depends on the purpose of the job, the state of technology, the costs for averting doses, and the benefits. Although implementation of the ALARA principle is a required integral part of each licensee's radiation protection program, it does not mean that each radiation exposure must be kept to an absolute minimum, but rather that "reasonable" efforts must be made to avert dose. In practice, ALARA includes planning tasks involving radiation exposure so as to reduce dose to individual workers and the work group.

There are several ways to control radiation doses, e.g., limiting the time in radiation areas, maintaining distance from sources of radiation, and providing shielding of radiation sources to reduce dose. The use of engineering controls, from the design of facilities and equipment to the actual set-up and conduct of work activities, is also an important element of the ALARA concept.

An ALARA analysis should be used in determining whether the use of respiratory protection is advisable. In evaluating whether or not to use respirators, the goal should be to achieve the optimal sum of external and internal doses. For example, the use of respirators can lead to increased work time within radiation areas, which increases external dose. The advantage of using respirators to reduce internal exposure must be evaluated against the increased external exposure and related stresses caused by the use of respirators. Heat stress, reduced visibility, and reduced communication associated with the use of respirators could expose a worker to far greater risks than are associated with the internal dose avoided by use of the respirator. To the extent practical, engineering controls, such as containments and ventilation systems, should be used to reduce workplace airborne radioactive materials.

15. What are background radiation exposures?

The average person is constantly exposed to ionizing radiation from several sources. Our environment and even the human body contain naturally occurring radioactive materials (e.g., potassium-40) that contribute to the radiation dose that we receive. The largest source of natural background radiation exposure is terrestrial radon, a colorless, odorless, chemically inert gas, which causes about 55 percent of our average, nonoccupational exposure. Cosmic radiation originating in space contributes additional exposure. The use of x-rays and radioactive materials in medicine and dentistry adds to our population exposure. As shown below in Table 3, the average person receives an annual radiation dose of about 0.36 rem (3.6 mSv). By age 20, the average person will accumulate over 7 rems (70 mSv) of dose. By age 50, the total dose is up to 18 rems (180 mSv). After 70 years of exposure this dose is up to 25 rems (250 mSv).

Table 3 Average Annual Effective Dose Equivalent to Individuals in the U.S.[a]

Source	*Effective Dose Equivalent (mrems)*	
Natural		
Radon	200	
Other than Radon	100	
Total		300
Nuclear Fuel Cycle		0.05
Consumer Products[b]		9
Medical		
Diagnostic X-rays	39	
Nuclear Medicine	14	
Total		53
Total		about 360 mrems/year

[a]Adapted from Table 8.1, NCRP 93 (Ref. 11).

[b]Includes building material, television receivers, luminous watches, smoke detectors, etc. (from Table 5.1, NCRP 93, Ref. 11).

16. What are the typical radiation doses received by workers?

For 1993, the NRC received reports on about a quarter of a million people who were monitored for occupational exposure to radiation. Almost half of those monitored had no measurable doses. The other half had an average dose of about 310 mrem (3.1 mSv) for the year. Of these, 93 percent received an annual dose of less than 1 rem (10 mSv); 98.7 percent received less than 2 rems (20 mSv); and the highest reported dose was for two individuals who each received between 5 and 6 rems (50 and 60 mSv).

Table 4 lists average occupational doses for workers (persons who had measurable doses) in various occupations based on 1993 data. It is important to note that beginning in 1994, licensees have been required to sum external and internal doses and certain licensees are required to submit annual reports. Certain types of licensees such as nuclear fuel fabricators may report a significant increase in worker doses because of the exposure to long-lived airborne radionuclides and the requirement to add the resultant internal dose to the calculation of occupational doses.

Table 4 Reported Occupational Doses for 1993[a]

Occupational Subgroup	Average Measurable Dose per Worker (millirems)
Industrial Radiography	540
Commercial Nuclear Power Reactors	310
Manufacturing and Distribution of Radioactive Materials	300
Low-Level Radioactive Waste Disposal	270
Independent Spent Nuclear Fuel Storage	260
Nuclear Fuel Fabrication	130

[a]From Table 3.1 in NUREG-0713 (Ref. 9).

17. How do I know how much my occupational dose (exposure) is?

If you are likely to receive more than 10 percent of the annual dose limits, the NRC requires your employer, the NRC licensee, to monitor your dose, to maintain records of your dose, and, at least on an annual basis for the types of licensees listed in 10 CFR 20.2206, "Reports of Individual Monitoring," to inform both you and the NRC of your dose. The purpose of this monitoring and reporting is so that the NRC can be sure that licensees are complying with the occupational dose limits and the ALARA principle.

External exposures are monitored by using individual monitoring devices. These devices are required to be used if it appears likely that external exposure will exceed 10 percent of the allowed annual dose, i.e., 0.5 rem (5 mSv). The most commonly used monitoring devices are film badges, thermoluminescence dosimeters (TLDs), electronic dosimeters, and direct reading pocket dosimeters.

With respect to internal exposure, your employer is required to monitor your occupational intake of radioactive material and assess the resulting dose if it appears likely that you will receive greater than 10 percent of the annual limit on intake (ALI) from intakes in 1 year. Internal exposure can be estimated by measuring the radiation emitted from the body (for example, with a "whole body counter") or by measuring the radioactive materials contained in biological samples such as urine or feces. Dose estimates can also be made if one knows how much radioactive material was in the air and the length of time during which the air was breathed.

18. What happens if a worker exceeds the annual dose limit?

If a worker receives a dose in excess of any of the annual dose limits, the regulations prohibit any occupational exposure during the remainder of the year in which the limit is exceeded. The licensee is also required to file an overexposure report with the NRC and provide a copy to the individual who received the dose. The licensee may be subject to NRC enforcement action such as a fine (civil penalty), just as individuals are subject to a traffic fine for exceeding a speed limit. The fines and, in some serious or repetitive cases, suspension of a license are intended to encourage licensees to comply with the regulations.

Radiation protection limits do not define safe or unsafe levels of radiation exposure. Exceeding a limit does not mean that you will get cancer. For radiation protection purposes, it is assumed that risks are related to the size of the radiation dose. Therefore, when your dose is higher your risk is also considered to be higher. These limits are similar to highway speed limits. If you drive at 70 mph, your risk is higher than at 55 mph, even though you may not actually have an accident. Those who set speed limits have determined that the risks of driving in excess of the speed limit are not acceptable. In the same way, the revised 10 CFR Part 20 establishes a limit for normal occupational exposure of 5 rems (0.05 Sv) a year. Although you will not necessarily get cancer or some other radiation effect at doses above the limit, it does mean that the licensee's safety program has failed in some way. Investigation is warranted to determine the cause and correct the conditions leading to the dose in excess of the limit.

19. What is meant by a "planned special exposure"?

A "planned special exposure" (PSE) is an infrequent exposure to radiation, separate from and in addition to the radiation received under the annual occupational limits. The licensee can authorize additional dose in any one year that is equal to the annual occupational dose limit as long as the individual's total dose from PSEs does not exceed five times the annual dose limit during the individual's lifetime. For example, licensees may authorize PSEs for an adult radiation worker to receive doses up to an additional 5 rems (0.05 Sv) in a year above the 5-rem (0.05-Sv) annual TEDE occupational dose limit. Each worker is limited to no more than 25 rems (0.25 Sv) from planned special exposures in his or her lifetime. Such exposures are only allowed in exceptional situations when alternatives for avoiding the additional exposure are not available or are impractical.

Before the licensee authorizes a PSE, the licensee must ensure that the worker is informed of the purpose and circumstances of the planned operation, the estimated doses expected, and the procedures to keep the doses ALARA while considering other risks that may

be present. (See Regulatory Guide 8.35, "Planned Special Exposures.")

20. Why do some facilities establish administrative control levels that are below the NRC limits?

There are two reasons. First, the NRC regulations state that licensees must take steps to keep exposures to radiation ALARA. Specific approval from the licensee for workers to receive doses in excess of administrative limits usually results in more critical risk-benefit analyses as each additional increment of dose is approved for a worker. Secondly, an administrative control level that is set lower than the NRC limit provides a safety margin designed to help the licensee avoid doses to workers in excess of the limit.

21. Why aren't medical exposures considered as part of a worker's allowed dose?

NRC rules exempt medical exposure, but equal doses of medical and occupational radiation have equal risks. Medical exposure to radiation is justified for reasons that are quite different from the reasons for occupational exposure. A physician prescribing an x-ray, for example, makes a medical judgment that the benefit to the patient from the resulting medical information justifies the risk associated with the radiation. This judgment may or may not be accepted by the patient. Similarly, each worker must decide on the benefits and acceptability of occupational radiation risk, just as each worker must decide on the acceptability of any other occupational hazard.

Consider a worker who receives a dose of 3 rems (0.03 Sv) from a series of x-rays in connection with an injury or illness. This dose and any associated risk must be justified on medical grounds. If the worker had also received 2 rems (0.02 Sv) on the job, the combined dose of 5 rems (0.05 Sv) would in no way incapacitate the worker. Restricting the worker from additional job exposure during the remainder of the year would not have any effect on the risk from the 3 rems (0.03 Sv) already received from the medical exposure. If the individual worker accepts the risks associated with the x-rays on the basis of the medical benefits and accepts the risks associated with job-related exposure on the basis of employment benefits, it would be unreasonable to restrict the worker from employment involving exposure to radiation for the remainder of the year.

22. How should radiation risks be considered in an emergency?

Emergencies are "unplanned" events in which actions to save lives or property may warrant additional doses for which no particular limit applies. The revised 10 CFR Part 20 does not set any dose limits for emergency or lifesaving activities and states that nothing in Part 20 "shall be construed as limiting actions that may be necessary to protect health and safety."

Rare situations may occur in which a dose in excess of occupational limits would be unavoidable in order to carry out a lifesaving operation or to avoid a large dose to large populations. However, persons called upon to undertake any emergency operation should do so only on a voluntary basis and with full awareness of the risks involved.

For perspective, the Environmental Protection Agency (EPA) has published emergency dose guidelines (Ref. 2). These guidelines state that doses to all workers during emergencies should, to the extent practicable, be limited to 5 rems (0.05 Sv). The EPA further states that there are some emergency situations for which higher limits may be justified. The dose resulting from such emergency exposures should be limited to 10 rems (0.1 Sv) for protecting valuable property, and to 25 rems (0.25 Sv) for lifesaving activities and the protection of large populations. In the context of this guidance, the dose to workers that is incurred for the protection of large populations might be considered justified for situations in which the collective dose to others that is avoided as a result of the emergency operation is significantly larger than that incurred by the workers involved.

Table 5 presents the estimates of the fatal cancer risk for a group of 1,000 workers of various ages, assuming that each worker received an acute dose of 25 rems (0.25 Sv) in the course of assisting in an emergency. The estimates show that a 25-rem emergency dose might increase an individual's chances of developing fatal cancer from about 20% to about 21%.

Table 5
Risk of Premature Death from Exposure to 25-Rems (0.25-Sv) Acute Dose

Age at Exposure (years)	*Estimated Risk of Premature Death (Deaths per 1,000 Persons Exposed)*
20–30	9.1
30–40	7.2
40–50	5.3
50–60	3.5

Source: EPA-400-R-92-001 (Ref. 2).

23. How were radiation dose limits established?

The NRC radiation dose limits in 10 CFR Part 20 were established by the NRC based on the recommendations of the ICRP and NCRP as endorsed in Federal radiation protection guidance developed by the EPA

(Ref. 12). The limits were recommended by the ICRP and NCRP with the objective of ensuring that working in a radiation-related industry was as safe as working in other comparable industries. The dose limits and the principle of ALARA should ensure that risks to workers are maintained indistinguishable from risks from background radiation.

24. Several scientific reports have recommended that the NRC establish lower dose limits. Does the NRC plan to reduce the regulatory limits?

Since publication of the NRC's proposed rule in 1986, the ICRP in 1990 revised its recommendations for radiation protection based on newer studies of radiation risks (Ref. 13), and the NCRP followed with a revision to its recommendations in 1993. The ICRP recommended a limit of 10 rems (0.1 Sv) effective dose equivalent (from internal and external sources), over a 5-year period with no more than 5 rems (0.05 Sv) in 1 year (Ref. 13). The NCRP recommended a cumulative limit in rems, not to exceed the individual's age in years, with no more than 5 rems (0.05 Sv) in any year (Ref. 14).

The NRC does not believe that additional reductions in the dose limits are required at this time. Because of the practice of maintaining radiation exposures ALARA (as low as is reasonably achievable), the average radiation dose to occupationally exposed persons is well below the limits in the current Part 20 that became mandatory January 1, 1994, and the average doses to radiation workers are below the new limits recommended by the ICRP and the NCRP.

25. What are the options if a worker decides that the risks associated with occupational radiation exposure are too high?

If the risks from exposure to occupational radiation are unacceptable to a worker, he or she can request a transfer to a job that does not involve exposure to radiation. However, the risks associated with the exposure to radiation that workers, on the average, actually receive are comparable to risks in other industries and are considered acceptable by the scientific groups that have studied them. An employer is not obligated to guarantee a transfer if a worker decides not to accept an assignment that requires exposure to radiation.

Any worker has the option of seeking other employment in a nonradiation occupation. However, the studies that have compared occupational risks in the nuclear industry to those in other job areas indicate that nuclear work is relatively safe. Thus, a worker may find different kinds of risk but will not necessarily find significantly lower risks in another job.

26. Where can one get additional information on radiation risk?

The following list suggests sources of useful information on radiation risk:

- The employer—the radiation protection or health physics office where a worker is employed.
- Nuclear Regulatory Commission Regional Offices:

King of Prussia, Pennsylvania	(610) 337–5000
Atlanta, Georgia	(404) 331–4503
Lisle, Illinois	(708) 829–9500
Arlington, Texas	(817) 860–8100

- U.S. Nuclear Regulatory Commission
  Headquarters
  Radiation Protection & Health Effects Branch
  Office of Nuclear Regulatory Research
  Washington, DC 20555
  Telephone: (301) 415–6187
- Department of Health and Human Services
  Center for Devices and Radiological Health
  1390 Piccard Drive, MS HFZ–1
  Rockville, MD 20850
  Telephone: (301) 443–4690
- U.S. Environmental Protection Agency
  Office of Radiation and Indoor Air
  Criteria and Standards Division
  401 M Street NW.
  Washington, DC 20460
  Telephone: (202) 233–9290

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*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. Copies may be purchased at current rates from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328 (telephone (202) 512-2249); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, VA 22161.

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[2] Single copies of regulatory guides may be obtained free of charge by writing the Office of Administration, Attn: Distribution and Services Section, USNRC, Washington, DC 20555, or by fax at (301) 415-2260. 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 20555-0001; telephone (202) 634-3273; fax (202) 634-3343.

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this Revision 1 to Regulatory Guide 8.29. A value/impact statement, which evaluated essentially the same subjects as are discussed in a regulatory analysis, accompanied Regulatory Guide 8.29 when it was issued in July 1981.

This Revision 1 to Regulatory Guide 8.29 is needed to conform with the Revised 10 CFR Part 20, "Standards for Protection Against Radiation," as published May 21, 1991 (56 FR 23360). The regulatory analysis prepared for 10 CFR Part 20 provides the regulatory basis for this Revision 1 of Regulatory Guide 8.29, and it 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–5712, November 1988), is available for inspection and copying for a fee in the NRC's Public Document Room at 2120 L Street NW., Washington, DC 20555–0001.

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_____ _____

STUDENT'S SIGNATURE DATE