Fayetteville State University

Radiation Safety Program

Environmental Health & Safety

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Contents

1. Purpose

This protocol establishes safety guidelines for the use of ionized radiation equipment at Fayetteville State University (FSU). This ensures compliance with federal, state, and university regulations while maintaining a safe environment for faculty, staff, and students.

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2. Scope

This policy applies to all individuals working with or around ionized radiation equipment within FSU laboratories, including:

- Faculty
- Staff
- Students
- Research personnel
- Laboratory technicians

Only **trained and authorized personnel** may operate ionized radiation instruments.

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3. Regulatory Compliance

FSU complies with federal and state regulations governing X-ray equipment, including:

- North Carolina Radiation Protection Commission (NCRPC)
- U.S. Nuclear Regulatory Commission (NRC) regulations
- Occupational Safety and Health Administration (OSHA) standards
- American National Standards Institute (ANSI) N.43.17 for radiation safety

FSU's Radiation Safety Officer (RSO) oversees compliance and monitoring.

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4. Responsibilities

4.1. Environmental Health & Safety (EHS)

- Ensure regulatory compliance with state and federal agencies.
- Conduct annual safety inspections of ionized radiation instruments (Geiger readings reports).
- Review records of dosimetry programs and review exposure records.
- Implement emergency response plans for radiation incidents.

4.2. Radiation Safety Officer (RSO)

- Approve all ionized radiation users before granting operational access.
- Ensure proper training and certification of personnel (Keep records available for EHS).
- Maintain an updated inventory of all ionizing radiation producing equipment.
- Review monthly radiation exposure levels
- Conduct radiation leak tests and exposure monitoring.
- Enforce safety measures and issue corrective actions.

4.3. Laboratory Managers & Principal Investigators (PIs)

- Ensure only trained personnel operate ionized radiation equipment.
- Provide an ionized radiation equipment inventory to RSO.
- Implement SOP for ionized radiation equipment. (Refer to Chemical Hygiene Plan)
- Maintain proper documentation of equipment maintenance logs.
- Conduct biannually safety checks (Appendix 1. Radiation Safety Inspection Checklist) and report any malfunctions to the RSO and EHS.

4.4. Authorized Users

- Complete ionized radiation safety training and complete documentation before using the instrument.
- Follow all safety procedures and access restrictions.
- Wear assigned personal dosimetry devices.
- Immediately report safety concerns, unusual readings, or incidents.

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5. Training & Authorization

All personnel using ionized radiation equipment must complete FSU's X-ray Safety Training, which includes:

- Fundamentals of X-ray diffraction and radiation hazards.
- Proper use of shielding and interlock systems.
- Regulatory compliance requirements.
- Emergency procedures for radiation exposure or equipment failure.
- Dosimetry monitoring and exposure limits.

Upon completion, personnel will receive written authorization from the Radiation Safety Officer (RSO).

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6. X-ray Safety Procedures

6.1. Operational Safety Measures

- Ionized radiation systems must never be operated with the shielding removed or interlocks bypassed.
- The system's interlock mechanism must be tested regularly to ensure proper function.
- Users must confirm proper enclosure of the sample chamber before initiating scans.
- Do not exceed manufacturer-recommended exposure settings.

6.2. Access Control

- ionized radiation equipment must be housed in a restricted-access laboratory.
- Only trained and authorized personnel may enter the X-ray lab.
- The lab door should display warning signage:
  - "X-RAY IN USE – AUTHORIZED PERSONNEL ONLY"
  - Radiation hazard symbol and emergency contact information.

6.3. Personal Protective Equipment (PPE)

- Dosimetry device (TLD/OSL) must be worn at all times when operating the system.
- Lab coats, gloves, and safety glasses should be used in compliance with lab safety standards (Refer to Chemical Hygiene Plan)
- Pregnant personnel should notify the RSO immediately for dose monitoring adjustments.

6.4. Radiation Monitoring

- Dosimetry device readings will be monitored by RSO and reported to EHS.
- The RSO will review monthly radiation exposure levels.
- Radiation survey meters should be used periodically to check for potential leaks.
- The laboratory must maintain a log of all surveys and inspections.

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7. Emergency Procedures

7.1. Suspected Radiation Exposure

- Immediately cease operation of the ionized radiation system.
- Notify the Radiation Safety Officer (RSO) and EHS.
- Remove affected personnel from the area.
- Conduct a radiation survey to identify any leaks or excessive exposure.
- Medical evaluation may be required depending on the exposure level.

7.2. Equipment Malfunction

- Shut down the ionized radiation unit immediately.
- Report the issue to the RSO, lab manager / principal investigator and EHS.
- Place "DO NOT USE" signage on the instrument until repaired.
- Follow the manufacturer's guidelines for servicing.

7.3. Fire or Other Emergency

- Evacuate the lab immediately.
- Activate the building fire alarm system if necessary.
- Call Campus Public Safety at (910) 672-1911.
- Inform emergency responders that X-ray-producing equipment is present.

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8. Maintenance & Inspections

Routine inspections will be conducted by EHS and the Radiation Safety Officer to ensure:

- Proper shielding and interlock functionality
- ionized radiation system compliance with state and federal guidelines
- Accurate radiation dose monitoring and leak detection

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9. Documentation & Record Keeping

The following records must be maintained for **at least 3 years**:

- Personnel training logs Appendix 2. Laboratory Training Roster
- Dosimetry records and exposure reports.
- Routine radiation surveys and inspections.
- Equipment maintenance and repair logs.
- Incident reports and corrective actions.

These records will be reviewed by the Chemical Safety Committee and made available for regulatory audits.

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10. Conclusion

Ensuring radiation safety compliance is essential for protecting students, faculty, and staff at Fayetteville State University. Adherence to these protocols minimizes exposure risks and ensures a safe research environment.

For questions, training, or compliance concerns, please contact:

Radiation Safety Officer (RSO):

Arun Sapkota: asapkota@uncfsu.edu

EHS Office:

James Core: jcore2@uncfsu.edu

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11. Appendices

11.1. Appendix 1. Radiation Safety Checklist

Radiation Safety Inspection Checklist
Fayetteville State University
1200 Murchison Rd, Fayetteville, North Carolina

Department: _____ **Building:** _____
Lab Number: _____ **Inspector:** _____
Inspection Date: ___ / ___ / _____ **Re-inspection Date:** ___ / ___ / _____

Rating:
✓ = Compliant ✗ = Non-Compliant **N/A** = Not Applicable

Inspection Item	(✓/✗/N/A)	Notes
Radiation warning signs posted and visible		
Personal dosimeters worn and functional		
Radiation exposure levels within limits		
Shielding in place and undamaged		
X-ray equipment functioning properly		
Emergency procedures posted and understood		
Proper storage of radioactive materials		
Leak tests performed as required		
Contamination surveys conducted and recorded		
Proper waste disposal of radioactive materials		
Geiger counter readings checked and recorded		

Additional Comments:

_____

_____

Inspector's Signature: _____ **Date:** ___ / ___ / _____

Corrective Actions Required? ☐ **Yes** ☐ **No**
Follow-up Assignee: _____ **Due Date:** ___ / ___ / _____

11.2. Appendix 2. Training Roster Log

Training Roster Log

Fayetteville State University
1200 Murchison Rd, Fayetteville, North Carolina

Trainee Name	Department	Lab Number	Date of Training	Trainer Name

Trainer's Signature: _____ **Date:** ___ / ___ / _____

Training Notes:

- Keep this log for **a minimum of 3 years**
- Training is required **annually** and when job duties change
- Attach training materials or sign-in sheets for EHS records