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| Fayetteville State University  Radiation Safety Program |
|  |
| Environmental Health & Safety |

**A logo for a university

AI-generated content may be incorrect.**

A building with a lawn in front of it

AI-generated content may be incorrect.

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| J. Daniel Core & Andrea Cortez  4-2-2025 |

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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.

1. **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.

1. **Regulatory Compliance**

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

* [North Carolina Radiation Protection Commission (NCRPC)](https://info.ncdhhs.gov/dhsr/ncrpc/index.html)
* 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](https://nap.nationalacademies.org/read/21710/chapter/7)

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

1. **Responsibilities**
   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.
  1. **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.
  1. **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.
  1. **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.

1. **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).

# **X-ray Safety Procedures**

* 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.
  1. **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.
  1. **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.
  1. **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.

1. **Emergency Procedures**
   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.
  1. **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.
  1. **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.

1. **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

1. **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.

# **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](mailto:asapkota@uncfsu.edu)

**EHS Office:**

James Core: [jcore2@uncfsu.edu](mailto:jcore2@uncfsu.edu)

Andrea Cortez: [acortez2@uncfsu.edu](mailto:acortez2@uncfsu.edu)

1. **Appendices**
   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: \_\_\_ / \_\_\_ / \_\_\_\_\_\_\_**

* 1. **Appendix 2. Training Roster Log**

**Training Roster Log**

Fayetteville State University  
1200 Murchison Rd, Fayetteville, North Carolina

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| --- | --- | --- | --- | --- |
| **Trainee Name** | **Department** | **Lab Number** | **Date of Training** | **Trainer Name** |
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**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