

SOP: Radiation Safety and Dose Management Guidelines

This SOP provides comprehensive **radiation safety and dose management guidelines** to protect personnel, patients, and the environment from harmful effects of ionizing radiation. It covers proper use of radiation sources, monitoring and controlling radiation exposure, personal protective equipment, safe handling and disposal of radioactive materials, emergency response protocols, regulatory compliance, and training requirements. The objective is to ensure safe practices that minimize radiation dose and maintain a radiation-safe workplace.

1. Purpose

To establish standard operating procedures for radiation safety and dose management to minimize occupational, patient, and environmental exposure to ionizing radiation.

2. Scope

This SOP applies to all staff, students, and personnel who work with or around ionizing radiation sources within the facility.

3. Responsibilities

- **Radiation Safety Officer (RSO):** Oversight of radiation safety program, training, and regulatory compliance.
- **Supervisors:** Ensure staff adherence to SOP and participation in safety training.
- **Personnel:** Comply with guidelines, use PPE, report unsafe conditions, and attend mandatory training.

4. Procedures

4.1 Use of Radiation Sources

- Obtain authorization before using any radioactive materials or equipment.
- Maintain an updated inventory of radiation sources.
- Follow manufacturer and facility instructions during use.
- Restrict access to controlled areas.

4.2 Monitoring and Dose Control

- Wear appropriate dosimeters (e.g., TLD or badge) at all times when working with radiation.
- Review personal dose reports regularly.
- Adhere to dose limits recommended by regulatory agencies (refer to Table 1 below).
- Employ time, distance, and shielding principles to minimize exposure.

Personnel Category	Annual Dose Limit (mSv)
Occupational Workers	20 mSv (averaged over 5 years)
Pregnant Workers (fetal limit)	1 mSv (entire pregnancy)
General Public	1 mSv

4.3 Personal Protective Equipment (PPE)

- Wear lead aprons, thyroid collars, and gloves as required.
- Inspect PPE for defects and replace as needed.
- Store PPE properly after use.

4.4 Safe Handling and Disposal of Radioactive Materials

- Label radioactive materials clearly.
- Store radioactive waste in designated, shielded containers.
- Maintain waste disposal records as per regulatory requirements.
- Follow approved waste disposal procedures and schedules.

4.5 Emergency Response

- Evacuate the area if a spill or accidental exposure occurs.
- Notify the RSO or emergency personnel immediately.
- Provide first aid and medical attention as required.
- Document incidents and participate in investigations.

5. Regulatory Compliance

- Adhere to national and local radiation regulations (e.g., NRC, IAEA, OSHA).
- Maintain records of training, exposure, and equipment maintenance.
- Participate in inspections and audits as required.

6. Training Requirements

- Complete initial radiation safety training before commencing work.
- Attend annual refresher courses and updates.
- Participate in emergency drills and PPE use demonstrations.

7. Record Keeping

- Store all radiation safety and dose monitoring records for the duration specified by regulations.
- Ensure accessibility of records for audits and inspections.

8. References

- International Atomic Energy Agency (IAEA) Safety Standards
- U.S. Nuclear Regulatory Commission (NRC) Guidelines
- Occupational Safety and Health Administration (OSHA) Radiation Protection Regulations
- Facility-specific Radiation Safety Manual