Radiation Safety and Protection Program

Chapman University
November 2022

Assistance Provided By
Orange Coast Testing

Contents

1.0 Scope of work

1.1 This procedure establishes minimum requirements for utilizing X-ray radiation under the laws of the State of California.

2.0 Responsibilities

2.1 Radiation Safety Officer (RSO) -3 shall be responsible for enforcing safe practices relating to the use of radiation-producing devices. The RSO shall be responsible for proper record keeping and keeping updated operating and emergency procedures. They shall be responsible for maintaining logs of all incident reports and investigations. They shall be responsible for ensuring that all personnel are properly trained on the operation and safe handling of X-ray producing equipment. training of all personnel concerning operation and safe handling of radiation-producing equipment. They shall be responsible for maintaining a current file of all necessary specifications and regulations pertaining to Radiographic Inspection.

2.2 User – Any individual engaged in activities subject to this procedure.

2.3 Operator – Users charged with the monthly inspections and maintenance, and the access to the machine keys.

3.0 Radiation Safety Training

3.1 No individual shall operate a cabinet X-ray system until such individual has received copies of, instruction in, and demonstrated understanding of, the user's operating and emergency procedures by obtaining a passing grade of at least 80 percent on a written examination covering this material. The written exam shall be at least 50 questions in length. This training can be in person or online.

3.2 No individual shall operate a cabinet X-ray system until such individual has demonstrated competence to use the radiation machines by obtaining a passing grade of at least 80 percent on a practical examination covering this material. The practical examination shall be at least 25 questions in length.

3.3 Documentation demonstrating compliance with this section shall be maintained and available for inspection.

4.0 Safety Procedures

Users and Operators of X-Ray Cabinet must:

4.1 Operators must conduct a self-inspection every month. Note results in the Self-Inspection log.

4.2 Users should ensure all warning notices, lamps, and signals are working properly before operating the machine.

4.3 Check the following before starting the machine:

a. All service panels are closed and locked.

b. Emergency "Off" switches are in the released (out) position.

c. The X-Ray Cabinet is clear of objects.

4.4 Operate X-Ray Cabinet properly (according to the manufacturer's recommendations and training received) to control and limit radiation exposure to individuals.

4.5 Contact the Operator to schedule a service or request maintenance.

4.6 Notify your immediate supervisor or Operator immediately if an X-Ray Cabinet appears to be malfunctioning.

Users and Operators of X-Ray Cabinet must not:

4.7 Place any part of his or her body into the X-Ray Cabinet while the X-ray component is "On." An X-ray generator produces X-rays only when the X-ray lamps are lit.

4.8 Perform any maintenance on an X-Ray Cabinet's system.

4.9 Introduce any liquids into the interior of any X-Ray Cabinet.

4.10 Leave the X-ray machine while it is in scanning mode.

In Case of Emergency:

4.11 Immediately press the "**Emergency Stop**" button (located at the front of the machine) to stop the X-Ray Cabinet from operating.

4.12 Contact EH&S and Operator to report the problem.

5.0 Operating Procedures

Users and Operators of X-Ray Cabinet must:

5.1 The Operator should ensure that required notices (current copy of the State Code of Regulations; current copy of the Notice to Employees) are posted or easily available.

5.2 To obtain the access key users must sign the log-book to get the key from the locker in 85-230. The check in and check out time must be documented. The user will also have to sign the utilization log for the X-ray cabinet which is located next to the cabinet.

5.3 Turn on the X-Ray Cabinet with the main operating key.

   a. If the machine does not "power up," the user/operator should check that power cords are plugged in properly, the "Off" buttons are in the pulled-out position, and the breaker switch is in the "On" position.

5.4 Follow these procedures once the machine is on:

   a. Check that the main menu appears on the screen.

   b. Check that the date and time are correct on the PC.

   c. Ensure that the "Caution: X-Rays" sign is visible.

5.5 Remain with the X-Ray Cabinet at all times when the machine is in operation.

5.6 Turn off equipment, using the key, and secure machines at the end of the procedure so it is inoperable to unauthorized persons.

5.7 Return key to its designated lock box.

6.0 Annual Audit Checklist

6.1 EH&S will conduct the annual audit of the radiation safety and protection program. Both hard copy and digital versions must be saved.

7.0 Recordkeeping Responsibilities

7.1   EH&S is responsible for the logs listed below:

- Training Logs
- Log of manufacturer's annual inspection

7.2   The Operator is responsible for the logs listed below:

- Utilization Log
- Monthly Self-Inspection Log
- Maintenance Log

7.3   EH&S will keep copies of all records for a minimum of three years.

7.4   List of records kept:

- Manufacturer's record of receipt for each X-Ray Cabinet Registration
- Training Log
- Utilization Log
- Monthly Self-Inspection Log
- Maintenance Logs
- Inspection reports by the California Department of Public Health, Radiologic Health Branch

8.0   Points-of-Contact List

8.1   To schedule a service or request maintenance, notify the Operator.

8.2   For health and safety concerns, contact Environmental Health and Safety department (EH&S).

8.3   **IN CASE OF EMERGENCY** - If the X-Ray Cabinet appears to be malfunctioning and you suspect a radiation leak and/or exposure:

- Press **stop** and notify EH&S or the Operator.

Public Safety 24 Hour (714) 997-6763

- Aftab Ahmed, Associate Professor, Research Faculty and Core Laboratory Manager, School of Pharmacy, aahmed@chapman.edu, (714) 516-5465

- Sha Webster, Laboratory Special and Operator, School of Pharmacy, shwebster@chapman.edu , (714) 516-5419

- Chuck Sohaskey, Directory of Laboratory Safety, Risk Management/Environmental Health & Safety, sohaskey@chapman.edu (714) 516-7199

- Karen Swift, Manager Environmental Health & Safety, Radiation Safety Officer, Risk Management/Environmental Health & Safety, swift@chapman.edu , (714) 628-2888

9.0   References

9.1   Rad Source 2000 – Model RS2000, SN 3324 at 160 kV 25 mA – (check the manufacture's instruction about how to operate the machine)

9.2   PerkinElmer/Caliper Life Science, IVIS Spectrum CT, Model 128201/C, SN IS1717N7166 at 50kV 1.0mA – (check the manufacture's instruction about how to operate the machine)

9.3   Bruker/Excillum MetalJet-D2, 208863 at 21-70 kV 4.3 mA – (check the manufacture's instruction about how to operate the machine)

9.4   California Code of Regulations – Title 17, Division 1, Subchapter 4

9.5   Code of Federal Regulations – Title 10, Chapter 1, Part 20

10.0 Approval

10.1 This document is reviewed annually.

Approver and Title	Signature and Date
Karen Swift Mgr EH&S	11/17/22
SHA Webster Lab specialist	11/23/2022
Chuck Sohaske Lab Safety Admin	11/23/2022

Radiation Safety and Protection Program:
Annual Audit Checklist

Directions: EH&S will use this checklist to conduct the annual audit of the radiation safety and protection program.

Equipment name ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Room location: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Equipment Audit

☐ Records of the initial receipt of the X-Ray Cabinet is available for inspection, and stored in a centralized place

☐ Current copy of State Code of Regulations is bookmarked on a nearby computer and available for inspection and personnel review.

☐ All X-ray equipment are registered with the State Department of Public Health, Radiologic Health Branch.
  - ☐ Registration is current
  - ☐ Copies of Registration are posted on each machine

☐ Required notices are conspicuously posted so that personnel can see the notices on the way to or from the X-ray equipment. These notices include:
  - ☐ Notice of the location of the Code of Regulations
  - ☐ Current copy of Notice to Employees
  - ☐ Recent notices of violation (if applicable)
  - ☐ Sign with the radiation symbol and the words "This equipment produces X-rays when energized"
  - ☐ Written operating and emergency procedures

☐ Annual manufacturer's maintenance inspection was conducted on (date): ⎯⎯⎯⎯⎯⎯
  - ☐ Records of these maintenance inspections are available for inspection and stored for three years in a centralized place

☐ Self-inspections are conducted on a regular basis and records of these inspections are available for inspection and stored in a centralized place

☐ Utilization logs are filled out properly and are available for inspection and stored for three years in a centralized place

Annual audit conducted by: _____

Date annual audit conducted: _____

Radiation Safety and Protection Program: Self-Inspection Log for X-Ray Cabinet

Directions: Using the Self-Inspection Checklist as a guide to conduct monthly self-inspections.

Manufacturer and serial number of device: _____

This screening device is located at: _____

Inspection Date	Operator (Print Full Name)	Emergency Switches, Buttons, Unusual Noises, Lights / Interlocks	Problem(s) Noted (Write "none," if no problems found)	Action Taken (Write N/A, if no problems found)