Example of SOP

**Safety Operation Procedures for Analytical X-ray Equipment**

1. The equipment should be used under the guidance and supervision of the equipment owner, designee or person in charge;
2. The equipment should be operated in such a way, that the authorized user does not expose any part of the body to the direct beam, and no other person is accidentally exposed;
3. Personal dosimeter badges must be worn when operating X-ray equipment. Wrist or finger dosimeter badges shall be worn when a close approach to the direct beam in unavoidable;
4. Shutters must be closed when loading sample;
5. The equipment should be located in a locked room that can be entered only by authorized users. If the equipment must be located in unrestricted areas, appropriate barriers should be installed and a key control switch must be installed to prevent unauthorized use;
6. Warning signs must be affixed on the outside of the room, on the door that provides access to the equipment. The sign must be clearly legible and visible at a distance of 2 meters to personnel approaching the room door. Warning labels must be affixed to the equipment;
7. Warning light must be provided when the X-ray tube is energized. Warning light must also indicate when the beam shutter is open;
8. All lights, meters and controls must be properly labelled and marked as to its function;
9. Necessary shielding should be provided before the X-ray tube is energized. The radiation levels should be within the permissible regulatory limit;
10. A fail-safe shutter should be fitted as close to the X-ray tube port as possible, and it cannot remain open unless a collimator or other attachment is in position;
11. Where appropriate and feasible, fail-safe interlocks should be installed on accessories or components for which their removal would cause direct access to the primary beam or to high radiation areas on the equipment. No interlocks or safety device shall be deliberately defeated;
12. Repairs or adjustment shall not be made when the tube is energized or with any safety cover removed;
13. Any defect in X-ray equipment shall be reported immediately to the authority responsible for the radiation safety of the particular machine or Radiation Safety. Repairs or maintenance work will be normally carried out by service specialists such as the manufacturer’s agents; when in-house personnel are involved, their competence to control any radiation hazard must be first established prior to any repair or maintenance work;
14. Extraordinary arrangement of equipment attachments such as camera, sample, etc., or modifications for the purpose of protection, shall be documented and filled. All arrangement shall be monitored for safety during and after construction;
15. Pre-operational Safety Checks (interlocks, safety devices, shutters, etc.) should be performed periodically to ensure their proper operation. Records of inspections, surveys and repairs shall be maintained;