Workplace Ionizing Radiation Safety Policy

Radiation is a hazard at not only medical and nuclear sites but also industrial workplaces where X-ray machinery, ultrasonic welding devices, lasers and other radiation-emitting equipment is used. As OHS director, you need to ensure that your company complies with the radiation safety requirements of your jurisdiction. Here's a policy template you can adapt to ensure compliance. Although it's geared toward X-rays, the template can be used for others forms of ionizing radiation.

1. **PURPOSE**

The purpose of this Policy is to ensure that activities involving equipment or devices that emit X-rays and other forms of ionizing radiation are conducted so as to minimize radiation hazards in accordance with the requirements of [province] occupational health and safety and other applicable regulatory requirements. This Policy applies to all X-ray machines and X-ray sources in ABC Company workplaces.

2. **DEFINITIONS**

For purposes of this Policy:

"X-rays" are a type of ionizing radiation (maximum energy greater than 5 KeV) that is generally produced from machines rather than emitted from radioactive materials.

“X-ray machine” means an electrically powered device, the principal purpose of which is the production of X-rays.

“X-ray source” means any device, or that portion of any device, that emits X-rays, whether or not the device is an X-ray machine.

“X-ray worker” means a worker who, as a necessary part of his/her employment, may be exposed to X-rays at hazardous levels.

3. **ROLES & RESPONSIBILITIES**

3.1 Corporate Directors, Officers & Managers

ABC Company directors, officers and upper managers are responsible for overall implementation and review of this Policy and furnishing the resources necessary to ensure its effectiveness.

3.2 OHS Coordinator

The ABC Company OHS Coordinator is responsible for development and day-to-day implementation of this Policy, including:

- Hazard of assessment of X-ray source work areas;
- Selecting and implementing engineering controls, safe work procedures and administrative controls to eliminate or minimize identified X-ray hazards and keeping exposure at or below regulatorily required levels;
- Selection, use, maintenance and inspection of required personal protective equipment (PPE), work area signs and equipment labels;
- Inspection of X-ray sources;
- Investigation of X-ray sources related to incidents and accidents, analysis of causes, and ensuring necessary corrective action is taken;
- X-ray incident reporting;
- Maintaining and retaining the records required by this

Policy;
- Developing, reviewing and, if necessary, delivering required X-ray safety training;
- Verification of personal dosimeter reports.

3.3 Supervisors

Supervisors are responsible for:

- X-ray safety education and training;
- Instructing all X-ray workers, prior to employment, of the potential hazards of X-ray radiation, including genetic effects;
- Ensuring that personnel wear appropriate PPE, radiation monitoring badges and/or pocket dosimeters as required;
- Allowing only authorized persons to enter rooms that are specified as restricted areas;
- Ensuring the OHS coordinator has an up-to-date listing of all users;
- Posting of required warning signs and labels;
- Reporting all radiation incidents to the OHS coordinator;
- Supplying the OHS coordinator a copy of the written instructions on safety procedures to be followed at each X-ray installation.

3.4 Permit Holder (PH)

The OHS coordinator will designate to be in charge of an X-ray source with the following responsibilities:

- Registering all X-ray sources before use, and deregistering the decommissioned ones;
- Ensuring that X-ray source supervisors and workers participate in the Company’s X-ray safety program training before operating or working near any X-ray sources;
- Ensuring the use of required PPE;
- Ensuring X-ray workers wear the required personal

dosimeter;
- Ensuring implementation of required safe work procedures for X-ray sources;
- Ensuring that all X-ray source supervisors and workers are trained in the safe operation of the specific X-ray sources they operate;
- Ensuring that all X-ray machines and X-ray sources are stored securely and safely when not in use so that they are not usable by unauthorized personnel or under unauthorized conditions;
- Allowing only trained X-ray sources supervisors and workers to operate or work near an X-ray source;
- Ensuring that all administrative and engineering controls are implemented;
- Correcting any unsafe conditions in a timely manner;
- Ensuring that all guests, visitors and other third persons are informed of and protected from potential X-ray source hazards;
- Immediately reporting any incidents to the OHS coordinator.

3.5 X-Ray Workers

X-ray workers and users of X-ray equipment are responsible for:

- Taking part in ABC Company’s X-ray safety program training before operating or working near an X-ray source;
- Being familiar with and carrying out all operational procedures and specific safety hazards of the X-ray sources that he/she operates;
- Reporting all unsafe conditions and/or known or suspected safety incidents to the PH.

4. REGISTRATION OF X-RAY SOURCES

Registration records of X-ray sources will be maintained to identify areas where X-ray sources are present so that

appropriate hazard assessment may be performed and necessary engineering and administrative controls may be put in place. The PH is responsible for the registration of all X-ray sources and the deregistration of decommissioned ones. The PH must also request a review of the approval if, after the installation of an X-ray in a permanent location, there is a change in:

- The position or use of the X-ray source;
- The use of the rooms or areas adjacent, horizontally or vertically, to the X-ray source, or
- Any shielding of the X-ray source.

5. **X-RAY HAZARD ASSESSMENT**

The OHS coordinator and PH will perform an X-ray hazard assessment of fixed and mobile X-ray machines, X-ray sources and work areas where X-ray equipment and devices are used to measure and calculate radiation exposure levels and identify potential risks.

6. **HAZARD CONTROLS**

Controls will be selected and implemented to eliminate or, if elimination is not reasonably practicable, minimize identified X-ray hazards in accordance with hierarchy of control principles.

6.1 Engineering Controls

Where reasonably practicable, engineering controls will be used, including physical barriers designed to keep the risks of using X-ray sources under control, which may include:

- Installation of shielding to reduce the dose received by X-ray workers under permissible limits;
- Diaphragms, cones and adjustable collimators or other suitable devices to limit the dimensions of the useful X-ray beam;
- If the radiation exposure in an area may exceed 25

microSv/h access to the area may be controlled by: (i) Locks or interlocks if the X-ray source is installed in a permanent location; (ii) Barriers and X-ray warning signs if the X-ray source is portable or mobile; or (iii) A guard or interlock which prevents entry of any part of the body into the primary beam path;
- Shutters installed near the exit of the X-ray tube capable of blocking the beam.

6.2 Administrative & Procedural Controls

Administrative and procedural controls will be used in lieu of engineering controls that are not reasonably practicable or as a supplement to engineering controls that are implemented, including:

- Safe work procedures for X-ray machines that will be kept close to the X-ray machine and always be available as a reference for all X-ray workers;
- Posting of X-ray warning signs on the doors of all X-ray rooms;
- Affixing X-ray warning labels to all X-ray equipment;
- Furnishing X-ray workers personal dosimeters;
- Performing a radiation survey of a new or modified X-ray installation and its vicinity before it is put into operation, to ensure compliance with regulatory requirements;
- Regular inspection of X-ray equipment, protective clothing and PPE.

6.3 PPE

ABC Company will furnish X-ray workers lab coats, lead aprons, gloves, goggles and other PPE necessary to protect against the hazards to which they are exposed.

6.4 Personal Dosimetry

All X-ray workers, supervisors or PHs working with or near an

open beam X-ray source must wear whole-body and ring personal dosimeters. If the door of a cabinet X-ray machine is open, the interlock is bypassed for repair, maintenance or beam alignment, the X-ray source must be considered an open beam system. The OHS coordinator will verify that the dose recorded by the personal dosimeter is reasonable and appropriate in the circumstances and will notify a government OHS official of any dose that is above the regulatory limits. The OHS coordinator will retain the personal dosimeter records for 3 years.

7. **AUTHORIZED PERSONNEL**

No personnel may operate, maintain or service X-ray sources unless they receive authorization from the PH responsible for the X-ray machine. If authorization is given to an outside contractor, the PH must verify the qualifications and the records of X-ray safety training of the contractor and inform the OHS coordinator, who will then consult the list of authorized persons to verify that the contractor has the appropriate training.

8. **PREGNANCY PROTECTIONS**

X-ray workers who are, suspect they are or are trying to become pregnant must notify the OHS coordinator of their condition. Upon receiving notification, the OHS coordinator, HR department and X-ray worker will reassess the X-ray worker’s job responsibilities and training needs. Pregnant X-ray workers that remain in positions involving potential exposure to radiation will be provided with a Personal Electronic Dosimeter (PED). The weekly readings of the dosimeter will be communicated to the OHS coordinator at the end of each working week. Any unusual reading and anytime alarm sounds must be communicated to the OHS coordinator immediately.

9. **SIGNS & WARNING SIGNALS**

All rooms that have an X-ray source must have visible signs on

all doors indicating that this is an X-ray room. Each X-ray source must have signs indicating that X-rays are being produced and that moving of the X-ray source to a different room or area must be communicated to the OHS coordinator.

The control panel must indicate when the X-ray machine is producing X-rays. A warning light indicating when X-rays are being produced must also be mounted near each X-ray machine in such a way as to be visible from any direction from which the X-ray machine can be approached. The status of each shutter, open or closed, must be indicated at or near the X-ray tube.

The warning signal of cabinet X-ray equipment must be mounted on or near the cabinet in such a way as to be noticeable from any position from where the cabinet can be opened. Cabinet X-ray equipment that is intended to allow the entry of a person must also be provided with:

- Suitable audible or visible warning signals within the cabinet that are actuated for at least 10 seconds immediately before the initiation of X-ray production after the closing of any door that is designed to allow human access into the cabinet;
- Suitable audible or visible warning signals within the cabinet that activate during X-ray production;
- Effective means within the enclosure to prevent or interrupt the production of X-rays, that cannot be reset from outside the enclosure and that can be reached without having to pass through the primary X-ray beam.

10. **X-RAY SAFETY INSPECTIONS**

Periodic inspections of X-ray sources will be carried out in accordance with the ABC Company X-ray safety program. The OHS coordinator is responsible for inspecting all-new X-ray sources and also (at least annually) all X-ray machines to ensure compliance with the Company X-ray safety program. Any defect in a piece of X-ray equipment must be reported

immediately to the OHS coordinator.

11. **TRAINING AND EDUCATION**

All PHs, X-ray source supervisors and X-ray workers must complete the Company's X-ray safety training before operating or working near X-ray machines. Training will address:

- X-ray basics;
- X-ray hazards and bio-effects;
- Engineering and administrative controls;
- Required PPE;
- X-ray safety regulations and the Company X-ray safety program;
- Safe work procedures and specific safety hazards of the X-ray machines that they will operate or oversee
- Responsibilities;
- Causes of accidents; and
- X-ray accident reports.

All persons using the X-ray machine must take refresher training every 3 years.

12. **ACCIDENT/INCIDENT REPORTING & INVESTIGATION**

All X-ray-related accidents/incidents that cause or have the potential to cause personal injury must be reported to the OHS coordinator within 24 hours in accordance with the ABC Company injury reporting policy and procedures. Incidents or accidents involving death, critical injury, lost time or health care must be reported to government officials in accordance with [*province*] OHS and workers compensation laws.

All reported incidents and accidents will be investigated by the OHS coordinator to determine causes and identify necessary corrective actions. Copies of investigation reports will be provided to government officials and the workplace joint and health safety committee or health and safety representative in

accordance with OHS regulatory requirements.