X-Ray Regulatory Guide for Medical Facilities



STATE OF WISCONSIN

DEPARTMENT OF HEALTH SERVICES

Division of Public Health

Bureau of Environmental and Occupational Health

Radiation Protection Section

PO Box 2659

Madison, Wisconsin 53701

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# SAMPLE RADIATION SAFETY POLICY

All registrants are required to have a radiation safety program and a written radiation safety policy. This sample policy is to help a registrant include in the written safety policy with the minimum standards to meet Wis. Admin. Code ch. DHS 157 safety requirements. This is not an all-inclusive document. Additions and adjustments may need to be made to meet your current radiation uses.

## Changes in Registration

If there are changes in the registration for this facility, such as change of address, responsible party, new x-ray devices, etc., written notice must be sent to the Department of Health (DHS) within 30 days of the change. Change of ownership requires a new registration with full fees paid by the new owner. Addition of new equipment and/or the replacement/removal of old equipment also needs to be reported to ensure your annual registration fees are accurate. Changes to the registration information may be faxed to 608-267-4799 or mailed to Division of Public Health, Radiation Protection Section, PO Box 2659, Madison, WI 53701-2659. If you would like to send this electronically, please call 608-267-4782.

Current contact information for DHS is available at the following web address: <https://www.dhs.wisconsin.gov/radiation/xray/index.htm>

# OPERATING and SAFETY PROCEDURES

## Operating and Safety Procedures

This policy establishes procedures that will minimize radiation exposure to employees. The policy statements are provided to comply with regulations enforced by DHS, Radiation Protection Section. The regulations require that each x-ray facility and all x-ray devices at that address be registered with DHS and pay annual renewal fees.

The registrant MUST designate a person responsible for oversight and annual review of these procedures. This person is often referred to as the Person-in-Control or the Radiation Safety Officer (RSO). This individual has the responsibility and authority for assuring safe radiation practices and serves as the contact person between this facility and DHS. All questions and concerns regarding radiation safety for this facility should be directed to the RSO.

## Posting Notices, Instructions, and Reports to Workers

Employees must be familiar with the "Notice to Employees" document, which needs to be posted in an employee accessible area.

The location of written operations and safety procedures and location of where the regulations can be accessed is to be written in the lined box at the top of the “Notice to Employees” sign.

The certificate of registration, issued annually at the time of registration renewal, the operating and safety procedures and any notices of violations involving radiological working conditions are located at or nearby the x-ray devices.

The practice is required to provide staff access to the regulations. Your rights and obligations as a radiation worker are found in § DHS 157.88.

A copy of the Notice to Employees is available at our website <https://www.dhs.wisconsin.gov/radiation/index.htm> or by calling the Radiation Protection Section at 608-267-4782.

# OPERATOR SAFETY

## Training Requirements for X-Ray Machine Operators

All medical x-ray machine operators shall be licensed or permitted by the State of Wisconsin, Department of Safety and Professional Services for the imaging they are performing. Further information can be found at <http://www.dsps.wi.gov>. A copy of the license or permit shall be on-site and available for inspection. Additionally, all licensed healing arts practitioners who operate fluoroscopic equipment must be trained to operate the equipment safely per § DHS 157.76 (11). (See pages 11-12 of the [X-Ray Regulatory Guide, P-01639](https://www.dhs.wisconsin.gov/publications/p01639.docx)).

All operators of x-ray units shall acknowledge receipt of this training by signing an Operation and Safety Procedure Verification form located in or nearby the location of the x-ray device. (Wording for a Operation and Safety Procedure Verification form can be found in **Appendix B of the** X-ray Regulatory Guide**).**

X-ray machine operators need to be trained on each piece of x-ray equipment they will be using. Although they may have used similar equipment in the past, each unit could have unique operating characteristics. Training documentation will include a copy of the operating and safety procedures, as well as specific equipment-use training, date(s) of the training, a list and signatures of staff in attendance, and the qualifications of the person providing the instruction. (Wording for a Training Device form can be found in **Appendix C of the** X-ray Regulatory Guide).

## Individual Radiation Monitoring Requirements (DOSIMETRY)

Any adult who is likely to receive a dose from occupational exposure to radiation in excess of 5 mSv (500 millirem) in a year must use an individual monitoring device. In a medical/clinic setting where the doctor/owner is the only x-ray machine operator, monitoring devices are not required. Any associate doctors and/or employees who are likely to receive a dose from occupational exposure to radiation in excess of 5 mSv (500 millirem) in a year must use an individual monitoring device.

Your procedures should indicate whether the site ***has or has not*** issued dosimetry to staff.

## Use of Protective Devices

1. Use protective devices, such as lead aprons, gloves, and shields, to reduce exposure to radiation and keep radiation exposure as low as reasonably achievable (ALARA). Protective devices must be used or provided in the following situations:
2. When it is necessary for an individual other than the patient to remain in the room or hold a patient.
3. When it is necessary to protect other patients or staff who cannot be moved out of the room and are closer than 2 meters (6.5 feet), ex., critical care areas, emergency rooms, or trauma units.
4. If fluoroscopic procedures are being performed, protective devices shall be utilized; lead drapes and hinged sliding panels shall be in place to reduce the scatter (secondary) radiation to the operator.
5. Protective devices, gloves, aprons, and thyroid collars are stored near the x-ray devices. Specify location in your procedures.
6. Protective devices must be radiographically or fluoroscopically evaluated every two years for defects. The medical director or RSO must review these images. These devices should be checked annually for defects such as holes, cracks, or tears. This check can be done by visually inspecting or feeling the protective devices or by x-raying these items. If a defect is found at the time of either the radiographic or visual check or on any other occasion, notify the RSO and remove the device from service until it can be repaired or replaced. A record will be kept of these checks and be made available to an inspector. See Appendix E.
7. The x-ray exposure control (switch) shall be located within the shielded area and at least 1 meter (3.3 feet) from the open end of the protective barrier. This switch must be permanently mounted/secured preventing the operator from stepping beyond the barrier edge during the exposure.

## Holding of Patients and/or Image Receptor

* 1. If a patient or image receptor must be supported during an imaging procedure, use a mechanical holding device when circumstances permit. Situations where mechanical devices cannot be routinely used are as follows should be detailed in your procedures.
  2. If it becomes necessary for an individual to hold a patient or image receptor, the holder shall not be pregnant. They must utilize protective devices, must be visually monitored, and have no unprotected body part within the direct beam.

## Radiation Incident or Overexposure

If any person suspects that there has been an excessive exposure or a radiation incident (i.e., exposing yourself or a coworker to the direct beam), immediately notify the RSO who will then notify DHS by phone 608-267-4787 and by fax 608-267-4799. DHS will investigate the alleged incident.

# PATIENT SAFETY

## As Low As Reasonable Achievable (ALARA)

To meet the intent of ALARA, the operator shall:

* 1. Use the lowest possible radiation exposure for each exam to obtain a diagnostic image, i.e., using the fastest speed image receptor available with the shortest exposure time.
  2. Avoid repeat x-rays by setting the correct technique obtained from technique charts available or using proper, preprogrammed settings within the x-ray control.
  3. Accurately position the tube head and image receptor.
  4. Provide protection to gonads for patients of childbearing age unless the shield interferes with the exam. Where applicable, protection of the thyroid is recommended.
  5. If the gonads are in or within 5 centimeters of the x-ray beam, shields must be used unless the use of the shield interferes with the diagnostic procedure. Properly sized gonadal cups generally do not interfere with measurement points in the pelvis.
  6. Ensure the primary beam collimation is NOT opened larger than the image receptor.

## Ordering of X-Ray Exams

No x-ray exams shall be taken unless ordered by a licensed healing arts practitioner. DHS 157 defines a licensed practitioner as a chiropractor, dentist, physician, podiatrist, physician assistant, nurse practitioner, radiologist’s assistant, or physical therapist licensed in Wisconsin. This may be a verbal order so long as there is a corresponding signed order entry in the patient chart or computer file. Orders require the signature of the licensed practitioner.

# SAFE OPERATION OF IMAGING EQUIPMENT

## X-Ray Machine Operator Position during an Exposure

* 1. The operator must be able to continuously view and communicate with the patient while remaining behind the barrier. The operator must be able to see every entrance to the room from the operator position. Entrances can be monitored directly, with mirrors or interlocks.
  2. During the exposure, the operator must be positioned within the barrier walls or during fluoroscopy so that their exposure is As Low As Reasonably Achievable (ALARA). Remember TIME, DISTANCE, and SHIELDING. When a patient needs to be supported, lead aprons, gloves, or other shielding shall be used for protection.

## Use of a Technique Chart

* 1. Technique charts are required for systems with adjustable techniques, such as kV, time and mA (x-ray tube current). A technique chart aids in reducing the exposure to the operator and patient by providing a standard technique based on patient size and type of study.
  2. Technique charts are to be displayed in the vicinity of the control panel of each x-ray machine.
  3. Some units have programmed techniques built into the control. If programmed techniques are no longer correct, written charts must be created and used or the programmed techniques must be updated by your service vendor or unit manufacturer.
  4. Any technique found on a chart or within the internal pre-sets that are not accurate need to be discussed with the RSO and corrected.
  5. When switching from analog film to digital imaging, be sure to post new technique charts. Exposure factors needed to produce a diagnostic image are often reduced for digital imaging.

## X-Ray Beam Restriction and Alignment

* 1. To meet the intent of ALARA, the useful x-ray beam shall be restricted to the area of clinical interest. Use the centering and beam-limiting devices (collimators, et al.) provided on the x-ray machine.
  2. If the unit has automatic collimation and the system fails, the RSO must be notified immediately and have the unit repaired. Automatic collimators must continue to function per manufacturer’s recommendations unless repair parts are no longer available. If the automatic collimator cannot be repaired, you must notify the DHS Radiation Protection Section.
  3. Collimators are **NEVER** allowed to be open wider than the image receptor.
  4. Units that use apertures for collimation must have a means to center the x-ray beam to the image receptor or the area of clinical interest.

## Use of Mobile or Portable Machines

* 1. DHS 157 defines mobile x-ray equipment as mounted on a permanent base with wheels and/or casters for moving while completely assembled; portable x-ray equipment is defined as hand-carried. Battery-operated, hand-held dental x-ray devices must be approved by DHS prior to use.
  2. The x-ray machine operator must be positioned so that his/her exposure to scatter radiation is as low as reasonably achievable (ALARA). \*The operator shall remain 2 meters (6.5 feet) or more away from the tube and patient unless behind a barrier. The operator should never be in line with the direct beam.
  3. If the x-ray machine operator must be closer than 2 meters (6.5 feet) from the patient or tube, the operator must wear a lead apron. Lead aprons must be available at any location where a mobile or portable device is used, i.e., typically aprons are stored with or on a mobile or portable device.
  4. If using a portable or mobile device in the same location for more than one week, the equipment is considered stationary and must meet all the requirements of a stationary unit.
  5. No person may hold the x-ray tube housing during the exposure. A stand or other means of support shall be used during the exposure. There is the possibility of electric shock from improper grounding if the machine is held.

*\*Approved battery-powered dental x-ray devices are exempt from the 2 meter rule and wearing of lead apron requirement when manufacturer specifications are followed, i.e., use of the back scatter shield.*