

Youngstown State University
Department of Environmental & Occupational Health & Safety

X-Ray Generating Equipment
Quality Assurance Program

Introduction

This Quality Assurance Program has been developed for Youngstown State University (YSU) to serve as a mechanism that facilitates compliance with regulations established by The Ohio Department of Health's (ODH's) Bureau of Radiological Health, which governs use of x-ray generating equipment in the State of Ohio. All x-ray generating equipment must be licensed by the ODH Bureau of Radiological Health. Applicable regulations can be found on the website maintained by the Ohio Department of Health.

Scope

This program addresses the purchase, receipt, use and removal of all x-ray generating equipment by individuals on the YSU campus. The type of equipment addressed includes, but is not limited to the following: dental units such as intraoral, cephalometric, TMJ, panoramic, and tomographic x-ray tubes; non-medical units such as a luminoscope, particle accelerator, diffraction, fluorescence, spectrophotometer, analytical, electron microscope, gauging, baggage unit/cabinet, radiographic, fluoroscopic, CT, tomographic, electron beam processor, electron beam welder, electron beam coater, and cabinet irradiator.

Responsibility

Responsibility for compliance with rules and regulations pertaining to x-ray generating equipment as mandated by the ODH's Bureau of Radiological Health rests with each individual user of x-ray generating equipment. The University Radiation Safety Officer (RSO) will have the ultimate responsibility and authority to assure that these regulations are being followed within the University environment. Any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or an adjudication order issued and any response must be posted for a minimum of five working days or until corrective action is completed.

Purchase/Receipt

Prior to purchasing any new pieces of x-ray generating equipment, interested individuals should contact the RSO in writing, providing all pertinent information regarding the type of equipment to be purchased. This should include intended use, location, equipment description, vendor, etc. The RSO will process the necessary paperwork as required by the ODH Bureau of Radiological Health which adds the new unit(s) to the University's license. The RSO will inform users of established policies which deal with using x-ray generating equipment and provide each with a copy of this document. Once the equipment has been received, the user must notify the RSO as to its final location, forward copies of packaging slips, technical data operating procedures, etc. to the RSO.

Use of Equipment

Signs

The areas in which x-ray generating equipment are located must be posted with signage which informs those entering that x-ray generating equipment is present. This signage bears the radiation symbol and has the words "Caution - X-ray radiation. Authorized personnel only." A copy of the Notice to Employees from the ODH also must be posted in/by the room and in a sufficient number of places within the facility so as to inform all employees of the presence of x-ray generating equipment.

Operation

Each user must provide the RSO with a written copy of instructions detailing step-by-step operation, including safety procedures, of the equipment as well as a copy of the manufacturer's operations manual. Should any of the operating procedures be modified for any reason, the revised procedure should also be forwarded to the RSO.

Surveys

Surveys must be performed on new equipment upon installation, repair, or alignment. Each unit of x-ray generating equipment must be surveyed yearly for the purpose of detecting radiation in the vicinity of the machine. EOHS will provide a calibrated meter for this purpose. The user must supply a map of the room and the areas surveyed

Proper operation of safety devices such as interlocks, lights and labels must be documented at least every six months and be available for ODH inspection. These forms are to be sent to EOHS.

Dosimetry Badges

Some types of x-ray generating equipment necessitate users wearing personal dosimeters to monitor employee exposures. Some types of x-ray generating equipment are designed with a series of internal safety features that automatically deactivate the x-ray unit which eliminates the need for personal monitoring. Whether or not a dosimetry badge is required for use with a particular piece of equipment will be determined by the RSO after reviewing the intended experimental procedure and consulting with manufacturer's recommendations as found in the operator's manual. If badges are required, each individual who operates the x-ray equipment will be issued a badge. EOHS replaces dosimetry badges on a monthly or quarterly basis and maintains a report of all personal dosimetry records. Badges must not be removed from the area for any reason and should never be taken off campus. Annual reports are sent to all those requiring badges.

Because the thyroid is a major area of concern, whole body badges should be worn close to the neck area. Fetal badges are to be worn under the lead apron.

Area monitors will be provided as needed to determine adequacy of shielding or to detect scattered radiation.

Maximum Annual Permissible Dose		
Type of Dose	REM	Sieverts
Total Effective Dose	5.0	0.05
Sum of Deep Dose and Equivalent Committed Dose to Organs other than the eye.	50	0.5
Dose Equivalent to the eye.	15	0.15
Shallow Dose Equivalent to skin or extremities	50	0.5
Declared Pregnant Women (9 month)	.5	0.005
(1 month)	.05	0.0005
General Public	0.1	0.001

Reporting over-exposures

In the event that an individual obtains an exposure that is at or above that allowed by current regulations, the Radiation Safety Officer will contact the Ohio Department of Health as soon as he/she becomes aware of the exposure. The Radiation Safety Officer will also

notify the exposed individual within twenty-four hours and provide that individual all necessary information regarding the exposure along with the necessary steps in obtaining all medical surveillance necessary to safely deal with the particular situation.

In Case of Accident

In the event of an accident involving x-ray equipment the Radiation Safety Officer must be notified. This notification is to be made in addition to the EOHS accident report and the Supervisor's accident report. The RSO will then notify the Ohio Department of Health if required.

Training

Prior to working with x-ray generating equipment all users will be required to review the training material provided to them by the Department of Environmental and Occupational Health and Safety. Verification that this training has been completed will be recorded on the "Instruction to Workers" form. Individual faculty members will be responsible for assuring that graduate and undergraduate students using x-ray generating equipment are adequately trained and the documentation of this training is recorded.

Reg Guide 8.13 Instruction Concerning Prenatal Radiation Exposure

All females who will be working with x-ray generating equipment must be provided the NRC Regulatory Guide 8.13 as part of their training. They must also sign an acknowledgment form prior to any work with x-ray generating equipment.

Should any female working with x-ray generating equipment become pregnant and choose to declare her pregnancy, the "*Declaration of Pregnancy*" form must be filled out as soon as the individual becomes aware of her pregnancy.

Repair of X-ray Equipment

If repairs are needed on any piece of x-ray generating equipment, the RSO should be notified and have copies of any work done forwarded to the EOHS office.

Intra-oral instruments must be calibrated when installed. They may be calibrated more often if deemed appropriate.

Any bypass of interlocks must be approved by the RSO and the length of time recorded. The RSO and the operator must sign the record before and after any interlock mechanism bypass.

Evaluation of dental x-ray equipment will be performed every two years.

Relocation/Disposal of X-ray equipment

If it is intended to relocate a piece of x-ray generating equipment from its original location to another site, be it within the same building or to a different building, the RSO must be notified in writing.

If a piece of x-ray generating equipment is slated for disposal, the RSO must be notified so that the University's license with the ODH Bureau of Radiological Health is properly amended. All copies of documentation pertinent to the disposal of each x-ray unit must be forwarded to the RSO. This includes a letter of intent to dispose of the x-ray generating equipment which includes information that specifically identifies each unit (model, serial number, YSU tag number, etc.), as well as correspondence from the YSU Materials Management Department confirming removal of the x-ray unit from the University's inventory.

Equipment Inventory

Periodically, the RSO will request an inventory of all x-ray generating equipment be taken by each department. These records will be kept on file and will aid in ensuring that information contained on the University's license with the ODH is current and accurate.

December 2007