

## X-ray or other Radiation Producing Machine Inspection/Survey Guidelines

<b>SIGNAGE AND POSTINGS</b>	
<b>Inspection Topic</b>	<b>Regulation/Requirement</b>
Employee Notices Posted (DEQ Form 410-3, Emergency Procedures, Declared Pregnancy Notice)	DEQ 410-3, X-ray Machine Emergency Procedures, Declared Pregnancy must be posted inside X-ray laboratory in plain, unobstructed view.
X-ray Facilities Posted (door placard and stickers at entrances)	Laminated door placard with name of responsible authorized user and off-campus phone number must be posted on outside of door (or next to) in plain, unobstructed view
X-ray Area Posted	X-ray machine signs should be prominent around machine.  If machine is open beam, should somehow mark "safe zones" when machine is on.

<b>SURVEY AND EQUIPMENT</b>	
<b>Inspection Topic</b>	<b>Regulation/Requirement</b>
Operation procedures at or near control panel	Operation procedures (including emergency shutdown procedures!) should be at or near the control panel. These can be the manufacturer's instructions or written by PI, but they must include emergency shutdown procedures for your machine.
"Caution – High Intensity X-ray Beam" label at X-ray source housing	If housing of x-ray tube is visible/ accessible, it must have this label on it.
"Caution: Radiation – This machine produces radiation when energized" label at on/off switch	Must be present and clearly visible at power switch for machine (if machine is powered on by computer, it must be at computer control panel as well as on machine).
Unit has light that comes on when x-rays are being produced	There must be an indicator light that only comes on when x-rays are being produced.
Machine has RSO inventory sticker	This helps our office keep track of the machines – not regulatory.
Does machine have monitoring dosimeter in place?	All open beam machines require a monitoring badge at all times.  Enclosed units will require a monitoring badge their first year on campus.

## MACHINE INFORMATION

Inspection Topic	Regulation/Requirement
<b>Machine use log book</b>	<p>The RSO will require in 2010 that all x-ray machines have a log book where uses must be recorded.</p> <p>We will ask that dates, times, power settings (if outside of normal parameters as listed in operating procedures) and persons running the instrument be recorded for each use for all instruments.</p>
<b>Normal operating kVp and mA</b>	This will also be the power setting at which RSO will perform survey.
<b>Training Certificates – URCA</b>	Current training certificates for online training through the RSO must be available for all active users on a PI's permit <i>as well as those who use the machine but are not on your permit!</i>
<b>Training Certificates – Machine Specific</b>	Machine specific training is required for all personnel who work with an x-ray machine. <i>This includes personnel from other departments who are not on your permit but have been trained to operate the machine you are responsible for.</i> Such training must be documented and renewed on an annual basis. Records of this training for the last three years must be made available upon request.
<b>Personnel Dosimetry</b>	All x-ray users must be issued body and ring dosimeters.
<b>Monitoring equipment available in lab?</b>	If you have a meter in your lab that you use for x-ray monitoring it must be registered with the RSO and in current calibration.
<b>RSO survey results</b>	<p>RSO personnel will conduct a survey around the instrument while x-rays are being produced to ensure safety.</p> <p>In general, for cabinet systems we don't expect to find values greater than background levels.</p> <p>For open beam systems, we will test levels at prescribed distances from the unit and where the operator stands. This will verify the "safe" distances at which operators can stand while x-rays are being produced.</p>

<b>MACHINE SAFETY</b>	
<b>Inspection Topic</b>	<b>Regulation/Requirement</b>
<b>Security of use</b>	All machines must be secured so that unauthorized use is restricted. This can be a locked lab, an interlock key that is removed when not in use, a password-protected computer, etc.
<b>Interlock mechanism tested</b>	At least once per year, the RSO is required to test one or more of the interlock devices on your machine to make certain it is working properly.
<b>Has machine been serviced since last inspection?</b>	All service must be performed by qualified personnel, and if service included doing anything to the x-ray tube itself (even removing then replacing the same tube) the RSO must survey the instrument before the machine is used again.

<b>MISCELLANEOUS</b>	
<b>Inspection Topic</b>	<b>Regulation/Requirement</b>
<b>Proper PPE/dosimetry being worn where applicable</b>	Personnel using RAM must be wearing the proper PPE (gloves, goggles, lab coat, etc.) and dosimetry.