

# Minnesota State University, Mankato

## Analytical X-Ray Machine Self-Audit Checklist (Machines Capable of Operating Above 16kV)

Building & Room \_\_\_\_\_ Principal Investigator \_\_\_\_\_ Date \_\_\_\_\_

Audit By \_\_\_\_\_ Equipment in use \_\_\_\_\_

	Y	N	NA	Comments
<b>A. General Requirements</b>				
1. ORS radiation Survey preformed for machine in its current configuration and location.				
2. Written operating and alignment procedure available.				
3. Safety systems checked every six months and results documented.				
4. Analytical x-ray equipment operated only when safety devices are functioning.				
<b>B. Posting, Signs and Warning Lights</b>				
1. A clearly visible label with the words "Caution: This Equipment Produces X-Rays When Energized. To Be Operated Only By Authorized Personnel" attached near any switch that energizes the x-ray tube				
2. A clearly visible label with the words "Caution: High Intensity X-Ray Beam" located in a conspicuous location near the x-ray tube housing.				
3. A clearly visible warning light with fail-safe characteristics, labeled with the words "X-Ray On", located near any switch that energizes the x-ray tube				
4. A clearly visible warning light with fail-safe characteristics located near the tube housing, indicating when the x-ray tube is producing x-rays.				
5. MDH "Notice to Employees" posted.				
6. MDH and MSU,M registration number posted on the machine				
7. A "Caution X-Ray" Sign post on all doors entering the controlled area.				

Y	N	NA
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Comments

<b>C. Additional Requirements for Open Beam System</b>				
1. A clearly visible warning light or indicator located near each x-ray tube shutter, indicating when the shutter is open.				
2. Suitable barrier or marking to delineate the boundary between the radiation area and the controlled area.				
3. A system barrier surrounding each radiation area and limiting the dose to individuals in the surrounding controlled area to less than 5 mrem in 1 hour or 100 mrem in 5 consecutive days.				
4. Beam shutter provided for each port of the x-ray tube housing.				
5. Guard or interlock capable of preventing entry of ant part of the body into the primary beam.				
6. Each shutter interlock to allow opening only when the collimator or apparatus is in place.				
7. Shutter on unused ports secured.				
<b>D. Additional Requirements for enclosed Beam System</b>				
1. Interlocked to prevents x-ray exposure while enclosure is open.				
2. Chambers enclosing the x-ray tube housing, sample, detector and analyzing crystal to prevent entry of any part of the body during normal operation.				
3. Fail Safe interlock on sample chamber closure.				
<b>E. Monitoring and Training Requirements</b>				
1. Finger and body radiation monitoring badges provided for each user.				
2. Personnel monitoring results made available to machine users.				
3. All users trained by the ORS.				