

Draft MN Rules, Chapter 4732 - X-ray Revision, v1

4732.1200 [PURPOSE AND SCOPE.]

4732.1300 [DEFINITIONS.]

4732.1400 FACILITY AND X-RAY SYSTEM REGISTRATION.

Subpart 1. Applicability. A person or registrant is responsible for the x-ray systems under its administrative control and must comply with the requirements of this chapter.

- A. A person must register a facility and an x-ray system with the commissioner according to Minnesota Statutes, section 144.121.
- B. A registration for a facility or an x-ray system under this chapter is not transferable.
- C. A facility fee or an x-ray system fee paid under this chapter is not transferable or refundable.
- <u>X-ray systems that are in transit or inoperable are exempt from the requirements of</u>
 this chapter. For purposes of this part:
 - (1) inoperable means that the x-ray tube is removed from the x-ray system, or the x-ray system has been made physically inoperable by inactivating or dismantling

 the electrical circuitry such that the x-ray system is not capable of producing
 radiation; and
 - (2) in transit means x-ray systems that are non-operational and under the control of a registered service provider before installation are exempt from the registration and fee requirements of this part.

Commented [JC(1]: New definition:

Administrative control means the provisions relating to a registrant's oversight and compliance of x-ray systems, x-ray operators, quality assurance, procedures, recordkeeping, training, and all applicable requirements according to this chapter for the safe operation of a registered facility.

Commented [JC(2]: FL definition

- E. An x-ray system in storage must be registered according to this part. For purposes of this part, storage means a condition in which an operable x-ray system is not being used.
- F. Electron microscopy equipment is exempt from the requirements of this chapter according to Minnesota Statutes, section 144.121, subdivision 1a, paragraph c.
- G. Domestic television receivers that produce radiation incidental to its operation for other purposes are exempt from the requirements of this chapter provided the dose rate at 5 cm from any outer surface of 10 cm² is less than 0.5 mrem per hour.

Subp. 2. Out-of-state x-ray systems.

- A. A person that brings an x-ray system into the state for any use must:
 - (1) register the x-ray system with the commissioner;
 - (2) comply with all applicable laws and rules; and
 - (3) provide electronic or written notice to the commissioner of 3 working days before the x-ray system is to be used in the state.
- B. The notice under item A, subitem (3) must be on a form or in a format prescribed by the commissioner and includes:
 - (1) the facility registration number;
 - (2) the name of registrant;
 - (3) the type of x-ray system including manufacturer, model, and serial number;
 - (4) the name of the individual operating the registrant's x-ray system;
 - (5) the nature, duration, and scope of use;
 - (6) the facility physical location or locations where the x-ray system will be used;

Commented [JC(3]: Colorado:

A radiation machine that is out of service yet kept at a facility is exempt from the registration and certification evaluation provided:

- 1.the radiation machine has been made physically inoperable by inactivating or dismantling the electrical circuitry such that the radiation machine is not capable of producing radiation, and
- 2.the Department has received documentation of "Disposition of a Radiation Machine", or equivalent form, that is signed by a registered service technician

Commented [TP(4]: MI language; TN, MD

Commented [JC(5]: New definition:

Facility physical location means a single physical location where a registrant conducts business, x-ray systems are located, and at which the registrant or an employee of the registrant is available.

- (7) the name, email, and telephone number of contact person at the facility physical location where the x-ray system will be used; and
- (8) any additional information the commissioner deems necessary for evaluation.
- C. For purposes of this subpart, working days has the meaning given in part 1400.2030, subpart 1.

Subp. 3. Application; pre-registration.

- A. An applicant that is acquiring an x-ray system must pre-register with the commissioner.
- B. An applicant must provide all applicable pre-registration information on a form or in a format prescribed by the commissioner including:
 - (1) the legal name of the facility;
 - (2) the name, email address, and telephone number of the responsible individual of the facility;
 - (3) the address of the facility physical location where the x-ray system is located;
 and
 - (4) confirmation that a shielding plan for the acquired x-ray system is completed

 according to part 4732.####

 .

Subp. 4. Registration; initial.

- A. An applicant that is registering an x-ray system must submit to the commissioner:
 - (1) a completed application for registration under item B; and

Commented [JC(6]: https://www.revisor.mn.gov/rules/1/400.2030/

Commented [TP(7]: KY

Commented [JC(8]: Reference to **Shielding Plan** part (TBD)

- (2) a nonrefundable fee according to Minnesota Statutes, section 144.121, subdivision 1a.
- B. A registrant must apply for registration of its facility and x-ray systems within 30 days of installation and be registered before first use.
- C. The application for registration under item A, subitem (1), must be on a form or in a format prescribed by the commissioner and includes:
 - (1) the legal name of the facility;
 - (2) the facility registration number, if applicable;
 - (3) the mailing address, email address, telephone number, and, if applicable, the website address;
 - (4) the name, email address, and telephone number of the responsible individual of the facility;
 - (5) the name, email address, and telephone number of the individual designated
 as the radiation safety officer for the facility;
 - (6) the federal tax identification number of the facility;
 - (7) the Minnesota tax identification number of the facility, if applicable;
 - (8) indication of facility type;
 - (9) the x-ray system type, manufacturer, serial number, model number, and installation date of the x-ray system;
 - (10) the number of x-ray tubes in each x-ray system;
 - (11) the location of the x-ray system within the facility;
 - (12) the imaging receptor type;

(13) confirmation of the facility's institutional review board according to part

4732.####;

Commented [JC(9]: Reference to Registrant Responsibilities part (Subp. 22)

- (14) confirmation of off-site mobile or portable services provided by the facility;
- (15) the date of the application;
- (16) the signature or electronic authorization by the responsible individual certifying that the information is accurate and complete; and
- (17) any additional information the commissioner deems necessary for evaluation of the application for registration.

Subp. 5. Denial of application.

- A. The commissioner shall deny an application for registration if a registrant's registration does not meet the requirements of subpart 4.
- B. The commissioner shall follow the criteria for a denial of an application under

 Minnesota Statutes, section 144.99, subdivision 8, paragraph (a) or (b).
- C. The commissioner shall notify an applicant electronically or in writing of the denial of the registration and provide the reason for the denial.

Subp. 6. Notice of registration; issuance.

- A. The commissioner shall issue a notice of registration to a registration that meets the requirements of subpart 4.
- B. A registration is valid for one year from the date of issuance.

Subp. 7. **Registration; annual renewal.** A registrant must renew a registration annually by submitting an application and the nonrefundable fee under subpart 4 within 60 days of the expiration date of the existing registration.

Subp. 8. Registration; expiration.

- A. If a registrant does not submit an application for renewal according to subpart 4

 on or before the expiration specified on the notice of registration, then the

 registrant must cease operation.
- B. The commissioner shall apply a penalty fee for late registration according to

 Minnesota Statutes, section 144.121, subd. 1b.

Subp. 9. **Registration; suspension.** The commissioner shall suspend a registration issued under this chapter according to Minnesota Statutes, section 144.99 subdivision 9.

Subp. 10. **Registration; revocation.** The commissioner shall revoke a registration issued under this chapter according to Minnesota Statutes, section 144.99 subdivision 9.

Subp. 11. Registration; additional x-ray system.

- A. A registrant that acquires an additional x-ray system outside of renewal must submit to the commissioner:
 - (1) a completed application for an additional x-ray system under item B; and
 - (2) a nonrefundable fee according to Minnesota Statutes, section 144.121, subdivision 1a.
- B. A registrant must register additional x-ray systems within 30 days of installation and be registered before first use.

Commented [TP(10]: Late fees are incorporated within MN Statute

Subd. 1b.Penalty fee for late registration.

Applications for initial or renewal registrations submitted to the commissioner after the time specified by the commissioner shall be accompanied by an amount equal to 25 percent of the fee due in addition to the fees prescribed in subdivision 1a.

- C. The application for an additional x-ray system registration under item A must be on a form or in a format prescribed by the commissioner and includes:
 - (1) the legal name of the facility;
 - (2) the facility registration number;
 - (3) the facility physical location;
 - (4) the x-ray system type, manufacturer, serial number, model number, and installation date of the x-ray system;
 - (5) the manufacturer and serial number of the x-ray system tube insert;
 - (6) the location of the x-ray system within the facility;
 - (7) the imaging receptor type;
 - (8) confirmation of the facility's institutional review board according to part
 4732.####;
 - (9) confirmation of off-site mobile or portable services provided by the facility;
 - (10) the date of the application;
 - (11) the signature or electronic authorization by the responsible individual certifying that the information is accurate and complete; and
 - (12) any additional information the commissioner deems necessary for evaluation.

Subp. 12. Short-term use of x-ray systems. A person or a registrant that intends to use

x-ray systems for short-term use or demonstration in the state must:

- A. register according to this part;
- B. submit the nonrefundable fee according to Minnesota Statutes, section 144.121,
 subdivision 1a; and

Commented [JC(11]: Reference to Registrant Responsibilities part (Subp. 22)

Commented [TP(12]: MD

C. comply with the applicable requirements of this chapter.

Subp. 13. Changes to registration. A registrant must notify the commissioner

electronically or in writing within 30 days of any change that invalidates the following registration information:

- A. the legal name of the facility;
- B. the mailing address;
- C. the facility physical location;
- D. the facility email address;
- E. the responsible individual and contact information;
- F. the radiation safety officer and contact information;
- G. the federal tax identification number; and
- H. any additional information the commissioner deems necessary for evaluation.

Subp. 14. **Disposition of x-ray systems**. A registrant must notify the commissioner, on a form or format prescribed by the commissioner, within 30 days of any change in the disposition of a registrants registered x-ray system.

- A. The disposition notification includes:
 - (1) the legal name of the facility;
 - (2) the facility registration number;
 - (3) the facility physical location;
 - (4) the mailing address;
 - (5) the x-ray system type, manufacturer, model number, and serial number of the x-ray system;
 - (6) the number of x-ray systems remaining;

Commented [KM(13]: Similar: AR, CO, DE, FL, IA, LA, ME, MI, NC, ND, NM, OR, TX

- (7) the method of disposition of a registered x-ray system by:
 - a) sale or transfer;
 - b) disposal or recycle; or
 - c) rendering inoperable;
- (8) the registration number of the person taking possession of the x-ray system, if applicable; and
- (9) any additional information the commissioner deems necessary for evaluation
- B. A registrant that is removing an x-ray system from its registration by selling or transferring must submit documentation including:
 - (1) the name, mailing address, telephone number, and email address of the recipient; and
 - (2) the date the recipient takes possession.
- C. A registrant that is removing an x-ray system from its registration by disposing or recycling must submit documentation that the x-ray system is physically inoperable including:
 - (1) the method of disposal;
 - (2) the date of disposal;
 - (3) the name and address of the recycling company; and
 - (4) receipt from disposal.
- D. A registrant that indicates its x-ray system is out of service yet kept at a facility is exempt from registering the x-ray system only if:
 - (1) the x-ray system is inoperable; and
 - (2) the commissioner receives service report under item E.

E. A registrant that is removing an x-ray system from its registration by rendering it inoperable must submit the service report from a registered service provider indicating the x-ray system is inoperable and is no longer capable of producing radiation.

Subp. 15. Registration not implied. No person, in any advertisement, public notice, or other media posting, shall refer to the fact that their facility is registered with the commissioner, and no person shall state or imply that any activity under such registration has been approved by the commissioner.

Commented [JC(14]: Same: AL, DE, IA, KY, LA, ME, MI, NC, NM, OR, PA SSRCR; 4732.0200, subp. 2, item C

Registrant Responsibilities

Subp. 16. Registrant responsibilities for a service company or service provider. Before a registrant's first use of an x-ray system on individuals or before first use of an x-ray system in an industrial, research, forensic science, or veterinary setting, a registrant must complete and maintain the checklist under subpart 17.

Commented [JC(15]: CO 2.7 Service company registrant responsibilities TX (O)(2)

- A. This subpart applies to a registrant's:
 - (1) initial installation of an x-ray system in a new facility;
 - (2) initial installation of an additional x-ray system in an existing facility; or
 - (3) replacement of an x-ray system according to part 4732.####.
- B. A registrant must have a copy of the checklist under subpart 17 available for review by the commissioner upon request.

Subp. 17. Checklist contents and requirements. A registrant is responsible for completing a checklist on form or in a format prescribed by the commissioner.

Commented [JC(16]: Reference to Shielding Plan part (TBD)

- A. The checklist must be verified and signed by the registered service provider who performs the specific service.
- B. A registrant must verify that a shielding plan is completed according to part
 4732.#### for each x-ray system that requires a shielding plan.
- C. A registrant must verify its registration according to this chapter.
- D. Before first use of an x-ray system on individuals, or before first use of an x-ray system in an industrial, research, forensic science, or veterinary setting, a registrant must verify that the initial x-ray system installation equipment performance evaluation is performed according to:
 - (1) the manufacturer specifications;
 - (2) the equipment performance requirements under this chapter; and
 - (3) the applicable requirements under 21 CFR 1020.30 to 1020.33, and 1020.40, or successor requirements.
- E. For each installed x-ray system, a registrant must obtain the manufacturer's guidance documents, instructions manuals, and manufacturer specifications from a service company or service provider.

Subp. 18. Designation of radiation safety officer.

- A. A registrant must designate a radiation safety officer who meets the requirements under part 4732.####.
- B. A registrant, through the designated radiation safety officer, is responsible for the radiation safety activities according to registrant-approved duties and this chapter.

Commented [JC(17]: Reference to Shielding Plan part (TRD)

Commented [JC(18]: Reference to Radiation Safety Officer part

Subp. 19. Individuals qualified to operate x-ray systems on humans. A registrant must only allow individuals to operate an x-ray system if they meet the requirements under:

Commented [BB(19]: Similar: TX, IL

Commented [BB(20]: Similar: TX

A. part 4732.#### for a CT qualified operator;

- B. part 4732.### for a fluoroscopic qualified operator;
- C. part 4732.### for a radiographic qualified operator;
- D. part 4732.### for a dental qualified operator;
- E. part 4732.### for a breast biopsy qualified operator;
- F. part 4732.#### for a bone densitometry qualified operator; and
- G. part 4732.### for a security screening qualified operator.

Subp. 20. Personal protective equipment. A registrant must provide personal

protective equipment with a minimum of 0.25 mm lead equivalency.

- A. Personal protective equipment must be labeled with its lead equivalence.
- B. A registrant must evaluate protective garments for integrity initially, and at intervals not to exceed 24 months for breaks, tears, holes, missing material, or gaps, by:
 - (1) visual inspection;
 - (2) performing a tactile test; and
 - (3) imaging using a computed tomography excluding CBCT, fluoroscopy, or radiographic x-ray system if the registrant has such an x-ray system.
- C. A registrant must document the evaluation results for each protective garment including:
 - (1) the name of the individual who performed the evaluation;

Page 12

- (2) the date of the evaluation;
- (3) the pass or fail result;
- (4) any saved images under item B, subitem (3), if applicable.
- <u>D.</u> A registrant must remove from service any protective garment that fails the integrity evaluation.
- E. For purposes of this subpart, protective garments means a full apron, a half apron, a vest, gloves, a thyroid collar, and any radiation-absorbing material used for patient protection.

Subp. 21. Annual quality assurance program audit.

- A. A registrant must develop and implement an audit for the registrant's quality assurance program according to part 4732.####.
- B. A registrant must perform an on-site audit of the quality assurance program at intervals not to exceed 12 months.
- <u>A registrant must document and correct any noncompliance issues found during</u>
 <u>a quality assurance program audit.</u>

Subp. 22. Living human research; institutional review board. Nothing in this subpart relieves a registrant from complying with the applicable requirements in this chapter and applicable federal regulations governing the use of x-ray systems when conducting research involving living human subjects.

A. A registrant may conduct research involving living human subjects using x-ray systems if the research is conducted according to federal regulations for the

Commented [JC(21]: Reference to **Quality Assurance** part

Commented [JC(22]: CO

protection of living human subjects in research under Code of Federal

Regulations, title 21, part 56 and Code of Federal Regulations, title 45, part 46.

- B. Before imaging a living human subject, a registrant must:
 - (1) obtain prior review and approval of the research activities by an institutional review board;
 - (2) implement the requirements of The Federal Policy for the Protection of

 Human Subjects under Code of Federal Regulations, title 45, part 46; and
 - (3) obtain prior informed consent from the living human subjects.
- C. A registrant's research involving living human subjects must be conducted using
 x-ray systems authorized for medical use.
- D. For purposes of this part, human subject means an individual who is or becomes a participant in research, either as a recipient of the test article or as a control. A subject may be either a healthy individual or a patient.

4732.#### [SERVICE PROVIDERS.]

4732.#### LIMITED SCOPE X-RAY OPERATORS.

Subpart 1. **Applicability.** An individual who operates x-ray systems on living human beings in the discipline of limited medical radiography according to Minnesota Statutes, section 144.121, subdivision 5, must meet the educational and training requirements of this part.

Subp. 2. Limited scope x-ray operator examination registration.

An applicant for the limited scope x-ray operator examination must register by completing a form, or in a format prescribed by the commissioner, including:
 (1) legal name;

Commented [JC(23]: Advisory Committee: Should MDH define IRB for clarification purposes?

- (2) date of birth;
- (3) social security number;
- (4) mailing address;
- (5) phone number;
- (6) email address;
- (7) educational course attended;
- (8) training and classes completed;
- (9) modules;
- (10) electronic signature and date; and
- (11) any additional information the commissioner deems necessary.
- B. To be eligible for a limited scope x-ray operator registration, an applicant must:
 - (1) be eighteen years of age or older; and
 - (2) have a high school diploma or a GED certificate.
- C. An applicant for limited scope x-ray operator registration must provide all information required by the commissioner including:
 - (1) certificate of completion from a training course provider approved by the commissioner;
 - (2) documentation of completing and passing the required educational course according to subpart 6; and
 - (3) the nonrefundable registration fee according to Minnesota Statutes, section 144.121, subdivision 5, paragraph (d).

Commented [JC(24]: Dakota County Technical College; Inver Hills Community College

https://minnesotatraining.com/programs/healthcare/limited-scope-x-ray-certification/

Commented [BB(25]: Similar: WI, TN, DE, TX

Subp. 3. **Denial of application.** The commissioner shall deny an application for a limited scope x-ray operator according to Minnesota Statutes, section 144.99 subdivision 8.

Subp. 4. Limited scope x-ray operator practice. Pursuant to Minnesota Statutes, section 144.121, subdivision 5, an individual may only operate x-ray systems on humans after passing the core module examination and is limited to the regions of the human anatomy for which the individual has passed the module examination.

Commented [BB(26]: Multiple states limit the specific views and prohibit specific x-ray exams from being completed by limited scope x-ray operators.

- A. Before operating an x-ray system on humans, an individual must pass:
 - (1) the core module examination with a score of 70 percent or greater; and
 - (2) at least one of the module examinations for the region of the anatomy to be imaged under items B to F.
- B. An limited scope x-ray operator who has passed the module examination for chest allows an operator to image the:
 - (1) chest;
 - (2) ribs; and
 - (3) sternum.
- C. An limited scope x-ray operator who has passed the module examination for extremities allows an operator to image the:
 - (1) fingers;
 - (2) hand;
 - (3) wrist;
 - (4) forearm;
 - (5) elbow;

Commented [BB(27]: 75% - AK, CO, ME, NJ, UT, WY, TX 70% - AR, IA, NE, ND, OR, 65%-TN, IL,

Commented [BB(28]: Similar: NE, IL, KY,

Commented [BB(29]: Similar: NE, IL, KY

	М	N RULES, CH 4732 — DRAFT X-RAY REVISION, V1		
	(6) humerus;			
	(7) shoulder;			
	(8) clavicle;			
	(9) sc	apula;		
	<u>(10)</u>	toes;		
	<u>(11)</u>	foot;		
	<u>(12)</u>	ankle;		
	<u>(13)</u>	lower leg;		
	<u>(14)</u>	knee;		
	<u>(15)</u>	patella;		
	<u>(16)</u>	femur; and		
	<u>(17)</u>	<u>hip.</u>		
<u>D.</u>	An limited scope x-ray operator who has passed the module examination for			
	skull and sinuses allows an operator to image the:			Commented [BB(30]: Similar: NE, IL
	(1) sk	ال <u>ال</u> ا:		
	(2) paranasal sinuses;			
	(3) mandible; and			
	(4) facial bones.			
<u>E.</u>	. An limited scope x-ray operator who has passed the module examination for			
	spine	allows an operator to image the:		Commented [BB(31]: Similar: NE, IL
	<u>(1)</u> c	ervical spine;		
	<u>(2)</u> tl	noracic spine;		
		Page 17		

- (3) lumbar spine;
- (4) pelvis;
- (5) sacroiliac joints;
- (6) sacrum and coccyx;
- (7) abdomen; and
- (8) full spine for scoliosis.
- F. An limited scope x-ray operator who has passed the module examination for podiatric allows an operator to image the:
 - (1) foot;
 - (2) ankle; and
 - (3) distal third of lower leg.
- G. If an applicant does not pass a module under items B to F with a score of 70 percent or greater, then the individual is prohibited from imaging that region of the human anatomy.
- H. An applicant is limited to three attempts to pass any module examination. The three attempts must be completed within a 3-year period that starts when an initial application is approved by the commissioner.
- I. An applicant who does not pass any of the module examinations within a three-year period is no longer eligible to take the module examinations. To regain eligibility to take a module examination, an applicant must repeat and pass a commissioner-approved limited scope x-ray operator training course under subpart 7.

Commented [BB(32]: Similar: IL, NE, KY

Commented [BB(33]: NJ: after fourth attempts, redo LSXO training course

SC: after three attempts, redo LSXO training course
NE: after three attempts, wait one year and redo LSXO

training to become eligible again for exam

OR: three years to pass all exam modules

OH: after one attempt, redo LSXO training course **TN**: after fourth attempts, redo LSXO training course

DE: two attempts per calendar year

VA: after three attempts, redo LSXO training course

WY: after failed attempt, a 6 month waiting period before next attempt

FL: after five attempts, additional training is required

Commented [JC(34]: Reference to training approval

Subp. 5. **Prohibited uses.** Pursuant to Minnesota Statutes, section 144.121, subdivision 5, an individual who is registered with the commissioner as a limited scope x-ray operator is prohibited from operating:

- A. fluoroscopy x-ray systems;
- B. mammography x-ray systems;
- C. computed tomography x-ray systems; and
- D. x-ray systems during procedures using contrast media.

Subp. 6. Required educational course. An applicant for a limited scope x-ray operator registration must complete and pass an educational course under subpart 7 that is approved by the commissioner according to part 4732.#### and meets the requirements of this part.

Subp. 7. **Educational course content.** An educational course for a limited scope x-ray operator must have a minimum of 120 instruction hours and cover the subjects in this subpart.

- A. 10 hours of patient care:
 - (1) ethical and legal aspects;
 - (2) modes of communication including verbal, non-verbal, eye contact, and touching;
 - (3) challenges in communication;
 - (4) physical assistance and monitoring;
 - (5) medical emergencies;
 - (6) patient education, safety, and comfort;
 - (7) medical terminology; and
 - (8) infection control.

Commented [TP(35]: Advisory Committee: Discussion about requiring limited scope x-ray operators to be under personal supervision of a qualified trainer after completing the educational course?

Commented [TP(36]: 201 KAR: an applicant must complete an approved postsecondary educational program that meets the ASRT limited x-ray ray machine operator curriculum requirements. An individual must complete a formal education program for limited x-ray machine operators approved by the board. (KY)

Commented [JC(37]: Didactic training hours:

KY-240,

TN-90,

MT-min 104,

ND -80, IA-160+24 peds,

TX-125 (all modules) + 20 DR,

CO-80 hours,

WI - 336 hours

Clinical training hours:

KY-360, TN-230,

MT-min 48.

ND – 3 months or 120 hrs (only under direct supervision +3 months additional probationary clinical hours,

IA- 140 clinical practice exams, + 60 ped exams,

WI - 96-340 hours,

CO- 480 hours,

B. 12 hours of radiation physics:

- (1) structure of matter and the atom;
- (2) general description of production of x-rays;
- (3) x-ray emission, quantity and quality;
- (4) function of filtration and effects it has on x-ray beam;
- (5) types of function of beam limiting devices;
- (6) collimation;
- (7) design, features, and functions of x-ray tubes; and
- (8) circuitry of the x-ray system.
- C. 10 hours of radiobiology:
 - (1) effects of ionizing radiation on the human body;
 - (2) molecular and cellular radiobiology; and
 - (3) factors that cause somatic and genetic damage.
- D. 13 hours of radiation protection:
 - (1) ALARA;
 - (2) shielding materials;
 - (3) radiation quantity and units of measurement;
 - (4) basic interactions of x-rays with matter;
 - (5) primary and secondary scatter;
 - (6) importance of time, distance, and shielding;
 - (7) maximum permissible doses for occupational workers and the public; and
 - (8) patient protection.
- E. 20 hours of principles of exposure:

(1) factors that control and influence radiographic quality; (2) properties of x-rays; (3) size distortion; (4) shape distortion; (5) kVp, mAs, and time; (6) automatic exposure control (AEC) and manual settings; (7) grids; (8) collimation; (9) intensifying screens; (10) x-ray films and holders; (11) artifacts; and (12) inverse square law. F. 15 hours of procedures and processing: (1) film storage and handling; (2) manual, automatic processing film processing, and troubleshooting; (3) computed radiography (CR); (4) digital radiography (DR); (5) picture archiving and communication system (PACS); (6) quality assurance and quality control. G. 40 hours of anatomy and positioning: (1) chest; (2) extremities, including podiatry;

(3) spine; and

(4) skull and sinuses.

Subp. 8. Suspension of registration. The commissioner shall suspend an individual's limited scope x-ray operator registration according to Minnesota Statutes, section 144.99 subdivision 9.

Subp. 9. Revocation of registration. The commissioner shall revoke an individual's limited scope x-ray operator registration according to Minnesota Statutes, section 144.99 subdivision 9.

Commented [BB(38]: Similar: AK, IL, SC

Commented [BB(39]: Similar: AK, IL, SC