

CHAPTER 223. VETERINARY MEDICINE**GENERAL PROVISIONS**

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Authority

The provisions of this Chapter 223 issued under section 301 of The Atomic Energy Development and Radiation Control Act (73 P. S. § 1301) (Repealed); amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 223 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualifications); 25 Pa. Code § 225.104 (relating to X-ray detection systems for explosives, weapons and illegal items); 28 Pa. Code § 501.4 (relating to regulations); and 28 Pa. Code § 565.12 (relating to radiology service policy).

GENERAL PROVISIONS**§ 223.1. Purpose and scope.**

This chapter establishes radiation safety requirements for persons utilizing radiation sources in veterinary medicine. Persons who use radiation sources for veterinary medicine shall comply with this chapter. The requirements of this chapter are in addition to and not in substitution for other applicable requirements of this article.

Source

The provisions of this § 223.1 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (119229).

§ 223.2. [Reserved].**Source**

The provisions of this § 223.2 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (119229).

§ 223.2a. Definitions.

As used in this chapter, the following words and terms have the following meanings, unless the context clearly indicates otherwise:

C—Coefficient of variation—The ratio of the standard deviation to the mean value of a population of observations.

Dead-man switch—A switch so constructed that a circuit closing contact can be maintained only by continuous pressure on the switch by the operator.

Fluoroscopic imaging assembly—A subsystem in which X-ray photons produce a fluoroscopic image. The term includes the image receptors such as the image intensifier and spot-film device, electrical interlocks, if any, and structural material providing linkage between the image receptor and diagnostic source assembly.

Image receptor—A device, such as a fluorescent screen or radiographic film, which transforms incident X-ray photons either into a visible image or into another form which can be made into a visible image by further transformations.

Leakage radiation—Radiation emanating from the diagnostic or therapeutic source assembly except for the following:

- (i) The useful beam.
- (ii) Radiation produced when the exposure switch or timer is not activated.

Authority

The provisions of this § 223.2a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.2a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§§ 223.3—223.6. [Reserved].**Source**

The provisions of these §§ 223.3—223.6 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (119230).

§ 223.7. Structural shielding.

Facilities regularly used for diagnostic or therapeutic veterinary X-ray procedures shall have protective barriers sufficient to assure compliance with § 219.51 (Reserved).

Authority

The provisions of this § 223.7 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110-301 and 7110-302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.7 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 223.8. Operating procedures.

(a) Individuals, whose presence is not necessary to conduct the X-ray procedures, shall be located in a shielded area or at least 2 meters from the primary X-ray beam and X-ray tubehead.

(b) Mechanical supporting or restraining devices shall be used during X-ray procedures to hold the animal patient or films in position, when the technique permits.

(c) Individuals whose presence is necessary to conduct X-ray procedures and who are not located behind protective barriers or at least 2 meters from the X-ray tubehead and primary X-ray beam shall be protected with appropriate shielding devices such as lead aprons and gloves, and be positioned so that no part of their body except hands and forearms will be exposed to the primary beam. Appropriate shielding devices shall have a lead equivalent at least 0.25 millimeters of lead.

(d) X-ray exposures shall be authorized by a veterinarian.

Authority

The provisions of this § 223.8 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.8 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 223.12a (relating to fluoroscopic equipment).

X-RAYS**§ 223.11. Radiographic equipment.****(a) Leakage radiation.**

(1) The leakage radiation from the tube housing assembly with a beam-limiting device attached measured at a distance of 1 meter in any direction from the source may not exceed 100 milliroentgens (25.8 $\mu\text{C}/\text{kg}$) in 1 hour when the X-ray tube is operated at its maximum technique factors. Compliance shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters.

(2) The radiation emitted by a component other than the tube housing assembly with a beam-limiting device attached may not exceed 2 milliroentgens (0.516 $\mu\text{C}/\text{kg}$) in 1 hour at 5 centimeters from an accessible surface of the component when it is operated in an assembled X-ray system under conditions for which it was designed. Compliance shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters.

(b) X-ray beam restriction.

(1) The primary X-ray beam shall be restricted to the area of clinical interest and equal to or smaller than the image receptor.

(2) Collimating devices capable of limiting the primary beam to the appropriate image receptor to within 2% of the source to image distance shall be provided and used. They shall provide the same degree of protection as is required in subsection (a)(1) for a diagnostic source assembly.

(3) A means shall be provided to align the center of the X-ray field to the center of the image receptor to within 2% of the source to image distance.

(c) X-ray beam filtration. The total filtration permanently in the useful beam may not be less than .5 millimeters aluminum equivalent for machines operating up to 50 kVp, 1.5 millimeters aluminum equivalent for machines operating between 50—70 kVp and 2.5 millimeters aluminum equivalent for machines operating above 70 kVp.

(d) Exposure control devices.

(1) An exposure control device shall be provided to terminate the exposure after a preset time interval, preset product of current and time, a preset number of pulses or a preset radiation exposure to the image receptor. Termination of an exposure shall cause automatic resetting of the timer to its initial setting or to zero. It may not be possible to initiate an exposure with the exposure control device in the zero or off position, if either position is available, unless equipped for current adjustment.

(2) A means shall be provided to initiate the radiation exposure by a deliberate action on the part of the operator such as the depression of a switch. The switch shall be of the dead man type.

(e) The coefficient of variation for exposure may not exceed 0.10 when all technique factors are held constant. This requirement shall be deemed to have been met if, when 4 exposures are made at identical technique factors, the value of the average exposure (\bar{a}) is greater than or equal to 5 times the maximum exposure ($e(\max)$) minus the minimum exposure ($e(\min)$).

(f) Veterinary portable X-ray units shall be supported by a tube stand when the technique permits unless the unit is designed to be hand held during X-ray procedures.

(g) The X-ray control shall provide indication of the production of X-rays that is observable from the operator's position. The technique factors that are set prior to the exposure shall be indicated on the X-ray control and shall be visible to the operator from the operator's position.

Authority

The provisions of this § 223.11 amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.11 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (203901).

Cross References

This section cited in 25 Pa. Code § 223.12a (relating to fluoroscopic equipment).

§ 223.12. [Reserved].

Source

The provisions of this § 223.11 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (203901).

§ 223.12a. Fluoroscopic equipment.

(a) The fluoroscopic imaging assembly shall be provided with a primary protective barrier that intercepts the entire cross section of the primary beam at the maximum source to image receptor distance.

(b) The X-ray tube used for fluoroscopy may not produce X-rays unless the primary barrier is in position to intercept the entire primary beam.

(c) X-ray production in the fluoroscopic mode shall be controlled by a dead-man switch for the duration of any exposure. When recording serial fluoroscopic images, the fluoroscopist shall be able to terminate the X-ray exposures at any time. A means may be provided to permit completion of a single exposure of the series in process.

(d) The protective barrier may not transmit more than 2 milliroentgens (.516 $\mu\text{C}/\text{kg}$) per hour at 10 centimeters from an accessible surface of the fluoroscopic imaging assembly for each roentgen per minute of entrance exposure rate.

(e) During fluoroscopy and cinefluorography, the voltage and the current shall be continuously indicated.

(f) A cumulative timing device activated by the fluoroscope switch shall be provided. It shall indicate the passage of a predetermined period of irradiation either by an audible signal or by temporary or permanent interruption of the irradiation when the increment of exposure time exceeds a predetermined limit not exceeding 5 minutes.

(g) Fluoroscopic table designs when combined with normal operating procedures shall be of a type that no unprotected part of the staff or an ancillary individual's whole body is exposed to unattenuated scattered radiation which originates from under the table. The attenuation required may be not less than 0.25 millimeter lead equivalent.

(h) Equipment configuration when combined with normal operating procedures shall be of a type that no portion of the staff or an ancillary individual's whole body, except the extremities, is exposed to the unattenuated scattered radiation emanating from above the tabletop unless one of the following criteria is met:

(1) The individual is at least 120 centimeters from the center of the primary beam.

(2) The radiation has passed through at least 0.25 millimeter of lead equivalent material—for example, drapes, bucky-slot cover (film-tray cover panel), sliding or folding panel or self-supporting curtains—in addition to the lead equivalency provided by the protective apron referred to in § 223.8(c) (relating to operating procedures).

(i) In addition to the other requirements of this section, mobile fluoroscopes shall have image intensification.

Authority

The provisions of this § 223.12a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.12a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 223.13. [Reserved].**Source**

The provisions of this § 223.13 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (203902).

§ 223.13a. Therapeutic systems.

(a) When the tube is operated at its maximum technique factors, the leakage radiation may not exceed any of the following:

(1) One hundred milliroentgens (25.8 $\mu\text{C}/\text{kg}$) per hour at 5 centimeters from the surface of the tube housing assembly for contact therapy systems.

(2) One roentgen (.258 mC/kg) per hour at 1 meter from the source for 0-500 kVp systems.

(3) One-tenth percent of the exposure rate of the primary beam at 1 meter from the source for 501-999 kVp systems.

(b) Beam limiting devices used for limiting the primary beam shall provide at least the same protection as required by the tube housing assembly.

(c) Therapeutic X-ray systems shall be secured to prevent unauthorized use whenever the system is unattended.

(d) Interlocks shall be provided so that, when a door of the treatment room is opened, either the machine will shut off automatically or the radiation level within the room will be reduced to an average of not more than 2 milliroentgens (0.516 $\mu\text{C}/\text{kg}$) per hour and a maximum of 10 milliroentgens (2.58 $\mu\text{C}/\text{kg}$) per hour at a distance of 1 meter in any direction from the target; or interlocks will energize a conspicuous visible or audible alarm signal so that the individual entering and the operator are made aware of the entry. After a shut-off or reduction in output, it shall be possible to restore the machine to full operation only from the control panel.

(e) Interlocks, on-off beam control mechanisms and safety and warning devices shall be checked and appropriately serviced at least once in a calendar year.

(f) Treatment room entrances shall be provided with warning lights, which will indicate when the primary beam is on, in a readily observable position near the outside of access doors.

- (g) Exposure factors shall be displayed on the control panel.
- (h) Provision shall be made to permit continuous observation of the animal patient from the control panel during irradiation.
- (i) A registrant may not permit an individual to operate a therapeutic X-ray system until the individual has received a copy of, and instruction in, the operating procedures for the system and has demonstrated understanding of the operating procedures and competence in the use of the system.

Authority

The provisions of this § 223.13a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 223.13a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

RADIOACTIVE MATERIAL

§ 223.21. In vitro testing.

A veterinarian who uses radioactive material for in vitro testing shall comply with § 217.46 (Reserved) but is exempt from §§ 219.181—219.186 (Reserved).

Authority

The provisions of this § 223.21 issued under section 302 of the Radiation Protection Act (35 P. S. § 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20); amended under the Radiation Protection Act (35 P. S. §§ 7110.101—7110.703); and the Low-Level Radioactive Waste Disposal Act (35 P. S. §§ 7130.101—7130.906).

Source

The provisions of this § 223.21 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085. Immediately preceding text appears at serial page (170451).

§ 223.22. Sealed sources.

A veterinarian who uses sealed sources for therapeutic treatment of animals shall comply with Chapter 224, Subchapters G—I (Reserved) but is exempt from §§ 224.408 and 224.409 (Reserved).

Authority

The provisions of this § 223.22 issued under section 302 of the Radiation Protection Act (35 P. S. § 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20); amended under the Radiation Protection Act (35 P. S. §§ 7110.101—7110.703); and the Low-Level Radioactive Waste Disposal Act (35 P. S. §§ 7130.101—7130.906).

Source

The provisions of this § 223.22 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135. Immediately preceding text appears at serial page (123741).

[Next page is 224-1.]

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CHAPTER 224. MEDICAL USE OF RADIOACTIVE MATERIAL

Subch.	Sec.
A. GENERAL	224.1
B. OTHER REQUIREMENTS	224.21
C. [Reserved]	224.101
D. [Reserved]	224.151
E. [Reserved]	224.201
F. [Reserved]	224.251
G. [Reserved]	224.301
H. [Reserved]	224.351
I. [Reserved]	224.401
J. [Reserved]	224.451
K. [Reserved]	224.501

Authority

The provisions of this Chapter 224 issued under the Radiation Protection Act (35 P. S. §§ 7110.101—7110.703); the Low-Level Radioactive Waste Disposal Act (35 P. S. §§ 7130.101—7130.906); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 224 adopted June 19, 1992, effective June 20, 1992, 22 Pa.B. 3135, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualifications); and 25 Pa. Code § 217.1 (relating to purpose and scope).

Subchapter A. GENERAL

Sec.	
224.1.	Purpose and scope.
224.2—224.9.	[Reserved].
224.10.	Incorporation by reference.
224.11.	Effect of incorporation of 10 CFR Part 35.

§ 224.1. Purpose and scope.

This chapter prescribes requirements and provisions for the medical use of radioactive material and for issuance of specific licenses authorizing the medical use of radioactive material. These requirements and provisions provide for the protection of the public health and safety. The requirements of this chapter are in addition to, and not in substitution for, other applicable requirements in this article. Unless specifically exempted, the requirements of Chapters 215, 217—220 and 230 apply to applicants and licensees subject to this article.

Source

The provisions of this § 224.1 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5206. Immediately preceding text appears at serial page (170454).

§§ 224.2—224.9. [Reserved].**Source**

The provisions of these §§ 224.2—224.9 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203906) to (203910).

§ 224.10. Incorporation by reference.

(a) Except as provided in this chapter, the requirements of 10 CFR Part 35 (relating to medical use of byproduct material) are incorporated by reference.

(b) Notwithstanding the requirements incorporated by reference, 10 CFR 35.8, 35.990 and 35.991 (relating to information collection requirements: OMB approval; violations; and criminal penalties) are not incorporated by reference.

Source

The provisions of this § 224.10 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 224.11. Effect of incorporation of 10 CFR Part 35.

To reconcile differences between this chapter and the incorporated sections of 10 CFR Part 35 (relating to medical use of byproduct material), the following words and phrases shall be substituted for the language in 10 CFR Part 35 as follows:

- (1) A reference to “NRC” or “Commission” means Department.
- (2) A reference to “NRC or agreement state” means Department, NRC or agreement state.
- (3) A reference to “byproduct material” includes NARM.
- (4) The definition of “sealed source” includes NARM.
- (5) A reference to the Advisory Committee on the Medical Uses of Isotopes is synonymous with the Department’s Radiation Protection Advisory Committee.
- (6) Notifications, reports and correspondence referenced in the incorporated parts of 10 CFR shall be directed to the Department and, for NRC licenses, to the NRC until agreement state status is in effect.

Source

The provisions of this § 224.11 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

Subchapter B. OTHER REQUIREMENTS

Sec.	
224.21.	Supervision.
224.22.	Authorization for calibration and reference sources.
224.23.	Decay-in-storage.
224.51—224.60.	[Reserved].

§ 224.21. Supervision.

In addition to the incorporation by reference of 10 CFR Part 35 (relating to medical use of byproduct material), the licensee shall also:

(1) Permit only auxiliary personnel who have met the applicable radiologic requirements of 49 Pa. Code, Part I, Subpart A (relating to professional and occupational affairs) to use radioactive materials for diagnostic or therapeutic purposes.

(2) Permit only auxiliary personnel employed by a health care facility regulated by the Department of Health, the Department of Public Welfare or the Federal government to use radioactive materials for diagnostic or therapeutic purposes in accordance with written job descriptions and employee qualifications.

Source

The provisions of this § 224.21 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 224.22. Authorization for calibration and reference sources.

Notwithstanding the incorporation by reference of 10 CFR Part 35, a licensee authorized for medical use radioactive materials may receive, possess and use sealed sources of radioactive material up to 1,110 MBq (30 mCi) apiece for check, calibration and reference use.

Source

The provisions of this § 224.22 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 224.23. Decay-in-storage.

Notwithstanding the incorporation by reference of 10 CFR Part 35 (relating to medical use of byproduct material), a licensee may hold sealed sources of radioactive material with a physical half-life-of up to 300 days for decay-in-storage before disposal in ordinary trash.

Source

The provisions of this § 224.23 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§§ 224.51—224.60. [Reserved].**Source**

The provisions of these §§ 224.51—224.60 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203910) to (203915).

Subchapter C. [Reserved]**§§ 224.101—224.111. [Reserved].****Source**

The provisions of these §§ 224.101—224.111 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203916) to (203924).

§ 224.112. [Reserved].**Source**

The provisions of this § 224.112 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203924).

Subchapter D. [Reserved]**§§ 224.151 and 224.152. [Reserved].****Source**

The provisions of these §§ 224.151 and 224.152 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203924) to (203925).

Subchapter E. [Reserved]**§§ 224.201 and 224.202. [Reserved].****Source**

The provisions of these §§ 224.201 and 224.202 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203925) to (203926).

§ 224.203. [Reserved].**Source**

The provisions of this § 224.203 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203926).

§ 224.204. [Reserved].**Source**

The provisions of this § 224.204 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203927).

Subchapter F. [Reserved]**§§ 224.251 and 224.252. [Reserved].****Source**

The provisions of these §§ 224.251 and 224.252 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203927) to (203928).

§ 224.253. [Reserved].**Source**

The provisions of this § 224.253 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203928) to (203929).

§ 224.254. [Reserved].**Source**

The provisions of this § 224.254 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203929).

Subchapter G. [Reserved]**§§ 224.301—224.304. [Reserved].****Source**

The provisions of these §§ 224.301 and 224.304 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203929) to (203931).

§ 224.305. [Reserved].**Source**

The provisions of this § 224.305 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203931) to (203932).

§ 224.306. [Reserved].**Source**

The provisions of this § 224.306 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203932).

Subchapter H. [Reserved] **§§ 224.351 and 224.352. [Reserved].****Source**

The provisions of these §§ 224.351 and 224.352 reserved September 14, 2001, reserved September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203932) to (203933).

Subchapter I. [Reserved] **§§ 224.401—224.411. [Reserved].****Source**

The provisions of these §§ 224.401 and 224.411 reserved September 14, 2001, reserved September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203933) to (203942).

 § 224.412. [Reserved].**Source**

The provisions of this § 224.412 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203942).

 §§ 224.413 and 224.414. [Reserved].**Source**

The provisions of these §§ 224.413 and 224.414 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203942) to (203943).

Subchapter J. [Reserved] **§§ 224.451—224.465. [Reserved].****Source**

The provisions of these §§ 224.451 and 224.465 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203944) to (203953).

Subchapter K. [Reserved]

§ 224.501. [Reserved].

Source

The provisions of this § 224.501 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (903953) to (203954).

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**CHAPTER 225. RADIATION SAFETY REQUIREMENTS FOR
INDUSTRIAL RADIOGRAPHIC OPERATIONS**

Subch.	Sec.
A.	GENERAL PROVISIONS
B.	RADIATION-PRODUCING MACHINES
	225.1 225.71

Authority

The provisions of this Chapter 225 issued under section 301 of The Atomic Energy Development and Radiation Control Act (73 P. S. § 1301) (Repealed); and amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 225 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 78.111 (relating to abandonment); 25 Pa. Code § 215.32 (relating to exemption qualifications); 25 Pa. Code § 217.1 (relating to purpose and scope); 25 Pa. Code § 228.45 (relating to portable or mobile accelerators); 28 Pa. Code § 501.4 (relating to regulations); and 28 Pa. Code § 565.12 (relating to radiology service policy).

Subchapter A. GENERAL PROVISIONS

Sec.	
225.1.	Purpose and scope.
225.2.	[Reserved].
225.2a.	Incorporation by reference.
225.3.	[Reserved].
225.3a.	Effect of incorporation of 10 CFR Part 34.
225.4.	[Reserved].
225.4a.	Radiation safety program.
225.5.	[Reserved].
225.5a.	Reciprocity.
225.6.	[Reserved].
225.6a.	Prohibitions.
225.7.	[Reserved].
225.8.	[Reserved].
225.9.	[Reserved].
225.11—225.13.	[Reserved].
225.14.	[Reserved].
225.15—225.18.	[Reserved].
225.21.	[Reserved].
225.22.	[Reserved].
225.23.	[Reserved].
225.31—225.33.	[Reserved].
225.34—225.36.	[Reserved].
225.41—225.43.	[Reserved].

225-1

225.44. [Reserved].
225.51—225.53. [Reserved].
225.54—225.65. [Reserved].

§ 225.1. Purpose and scope.

(a) This chapter establishes radiation safety requirements for persons utilizing radiation sources for industrial radiography. Licensees and registrants who use radiation sources for industrial radiography shall comply with this chapter. The requirements of this chapter are in addition to and not in substitution for other applicable requirements in this article, in particular, the requirements and provisions of Chapters 215, 217—220, 228 and 230.

(b) Persons using only radiation-producing machines for industrial radiographic operations need not comply with § 225.2a (Reserved) unless otherwise specified in Subchapter B (relating to radiation producing machines).

(c) This chapter does not apply to the use of radiation sources for medical diagnosis or therapy.

Source

The provisions of this § 225.1 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (249332) and (203957).

§ 225.2. [Reserved].

Source

The provisions of this § 225.2 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203957) to (203958).

§ 225.2a. Incorporation by reference.

(a) Except as provided in this chapter, the requirements of 10 CFR Part 34 (relating to licenses for industrial radiography and radiation safety requirements for industrial radiographic operations) are incorporated by reference.

(b) Notwithstanding the requirements incorporated by reference, 10 CFR 34.5, 34.8, 34.121 and 34.123 are not incorporated by reference.

Source

The provisions of this § 225.2a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

Cross References

This section cited in 25 Pa. Code § 225.1 (relating to purpose and scope).

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§ 225.3. [Reserved].**Source**

The provisions of this § 225.3 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4895) to (4896).

§ 225.3a. Effect of incorporation of 10 CFR Part 34.

To reconcile differences between this chapter and the incorporated sections of 10 CFR Part 34, the following words and phrases shall be substituted for the language in 10 CFR Part 34 as follows:

- (1) A reference to "NRC" or "Commission" means Department.
- (2) A reference to "NRC or agreement state" means Department, NRC or agreement state.
- (3) The definition of "sealed source" includes NARM.
- (4) The definition of "licensed material" includes NARM.
- (5) Notifications, reports and correspondence referenced in the incorporated parts of 10 CFR shall be directed to the Department and, for NRC licenses, to the NRC until agreement state status is in effect.

Source

The provisions of this § 225.3a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 225.4. [Reserved].**Source**

The provisions of this § 225.4 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4896).

§ 225.4a. Radiation safety program.

A person who intends to use radiation-producing machines for industrial radiography shall have a program for training personnel, written operating procedures and emergency procedures, an internal review system and an organizational structure for radiographic operations which includes specified delegations of authority and responsibility for operation of the program. This program shall be approved by the Department before commencing industrial radiographic operations.

Source

The provisions of this § 225.4a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 225.5. [Reserved].**Source**

The provisions of this § 225.5 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4896).

§ 225.5a. Reciprocity.

Out-of-State users of radiation producing machines shall meet the requirements of § 216.7 (relating to out-of-State radiation-producing machines).

Source

The provisions of this § 225.5a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 225.6. [Reserved].**Source**

The provisions of this § 225.6 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4896).

§ 225.6a. Prohibitions.

Use of radiation sources covered under this chapter for diagnosis or therapy on humans or animals is not permitted.

Source

The provisions of this § 225.6a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 225.7. [Reserved].**Source**

The provisions of this § 225.7 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4896) to (4897).

§ 225.8. [Reserved].**Source**

The provisions of this § 225.8 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4897).

§ 225.9. [Reserved].**Source**

The provisions of this § 225.9 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4897).

§§ 225.11—225.13. [Reserved].**Source**

The provisions of these § 225.11—225.13 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203959) to (203960).

§ 225.14. [Reserved].**Source**

The provisions of this § 225.14 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203960) to (203961).

§§ 225.15—225.18. [Reserved].**Source**

The provisions of these §§ 225.15—225.18 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial text pages (203962) to (203964).

§ 225.21. [Reserved].**Source**

The provisions of this § 225.21 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203964).

§ 225.22. [Reserved].**Source**

The provisions of this § 225.22 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203965).

§ 225.23. [Reserved].**Source**

The provisions of this § 225.23 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203965) to (203966).

§§ 225.31—225.33. [Reserved].**Source**

The provisions of these §§ 225.31—225.33 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203966) to (203967).

§§ 225.34—225.36. [Reserved].**Source**

The provisions of these §§ 225.34—225.36 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (4902) to (4904).

§§ 225.41—225.43. [Reserved].**Source**

The provisions of these §§ 225.41—225.43 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203968) to (203970).

§ 225.44. [Reserved].**Source**

The provisions of this § 225.44 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203970) to (203971).

§§ 225.51—225.53. [Reserved].**Source**

The provisions of these §§ 225.51—225.53 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203971) to (203972).

§§ 225.54—225.65. [Reserved].**Source**

The provisions of these §§ 225.54—225.65 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4908) to (4916).

Subchapter B. RADIATION-PRODUCING MACHINES**GENERAL ADMINISTRATIVE REQUIREMENTS**

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Source

The provisions of this Subchapter B adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239, unless otherwise noted.

Cross References

This subchapter cited in 25 Pa. Code § 225.1 (relating to purpose and scope).

GENERAL ADMINISTRATIVE REQUIREMENTS**§ 225.71. Definitions.**

The following words and terms, when used this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Cabinet radiography—Industrial radiography conducted in an enclosure or cabinet (not a room) so shielded that doses to individual members of the public at every location on the exterior meet the limitations specified in 10 CFR 20.1301 (relating to dose limits for individual members of the public).

Cabinet X-ray system—An X-ray system with the X-ray tube installed in an interlocked enclosure or cabinet, designed to exclude personnel from its interior during operation.

(i) Included are all X-ray systems designed primarily for the inspection of baggage or packages.

(ii) An X-ray tube used within a shielded part of a building or X-ray equipment which may temporarily or occasionally incorporate portable shielding is not considered a cabinet X-ray system.

Certified cabinet X-ray system—An X-ray system which has been certified under 21 CFR 1010.2 (relating to certification) as being manufactured and assembled under 21 CFR 1020.40 (relating to cabinet x-ray systems).

DRD—Direct reading dosimeter—

(i) As used in this subchapter, means an “individual monitoring device” (see 10 CFR 20.1003 (relating to definitions)) that does not require additional processing to measure an individual’s dose.

(ii) The term also includes the direct reading personnel (individual) monitoring devices known as pocket dosimeter, pocket ionization chamber and electronic personal dosimeter (EPD).

Industrial radiography—An examination of the structure of materials by nondestructive methods, including fluoroscopy, which utilizes radiation producing machines to make radiographic images.

NVLAP—National Voluntary Laboratory Accreditation Program.

Permanent radiographic installation—A shielded installation or structure designed or intended for radiography in which radiography is regularly performed.

Personal supervision—The provision of guidance and instruction to a radiographer’s assistant given by a radiographer who is:

- (i) Physically present at the site.
- (ii) In visual contact with the radiographer's assistant while the assistant is using radiation sources.
- (iii) In proximity so that immediate assistance can be given if required.

Personnel dosimeter—As used in this subchapter, means any of the “individual monitoring devices” (see 10 CFR 20.1003) that shall be processed and evaluated to generate a permanent record of an individual's dose, for example, a film badge, thermoluminescent dosimeter (TLD) or optically stimulated luminescent dosimeter (OSLD).

RSO—radiation safety officer—An individual who ensures that, in the daily operation of the registrant's or licensee's radiation safety program, activities are being performed in accordance with approved procedures and are in compliance with Department requirements.

Radiographer—An individual who performs radiographic operations or an individual in attendance at a site where radiation producing machines are being used who personally supervises industrial radiographic operations.

Radiographer's assistant—An individual who, under the personal supervision of a radiographer, uses radiation producing machines or radiation survey instrumentation.

Radiographer trainee—An individual who is in the process of becoming a radiographer's assistant or a radiographer.

Radiographic operations—The activities associated with a radiation producing machine during use of the machine, to include surveys to confirm adequacy of boundaries, setting up equipment and any activity inside restricted area boundaries.

Shielded room radiography—Industrial radiography that is conducted in an enclosed room, the interior of which is not occupied during radiographic operations.

Temporary job site—A location where industrial radiography is performed for 180 days or less during any consecutive 12 months other than the location listed in a registration.

§ 225.72. Duties of personnel.

- (a) The RSO shall assure that the radiation safety program of the registrant or licensee is implemented and suspend or terminate operations that are not being conducted in accordance with approved procedures or the Department's requirements.
- (b) The radiographer is responsible to the registrant or licensee for following the procedures of the registrant or licensee and for complying with the Department's requirements while industrial radiographic operations are being conducted.

(c) The radiographer's assistant shall only use radiation producing machines or radiation survey instrumentation under the personal supervision of a radiographer.

(d) The radiographer trainee is not permitted to operate radiation producing machines or radiation survey instrumentation.

§ 225.73. Training of personnel.

(a) A registrant may not allow an individual to act as a radiographer or radiographer's assistant unless that individual meets the requirements of § 225.74 (relating to training and testing).

(b) Persons performing temporary job site radiography shall comply with the training requirements in 10 CFR 34, Subpart D (relating to radiation safety requirements).

§ 225.74. Training and testing.

(a) The registrant may not permit an individual to act as a radiographer until that individual has:

(1) Been instructed in the subjects outlined in Appendix A.

(2) Received copies of this chapter, Chapters 219 and 220 (relating to standards for protection against radiation; and notices, instructions and reports to workers; inspections and investigations), and copies of the license or certificate of registration and the operating and emergency procedures of the registrant or licensee.

(3) Received instruction covering regulatory requirements, operating and emergency procedures and the use of radiation-producing machines and radiation survey instruments of the registrant or licensee.

(4) Demonstrated competency and understanding of the information in this subsection to the satisfaction of the registrant or licensee as evidenced by the successful completion of a written test and a field examination.

(b) The registrant or licensee may not permit an individual to act as a radiographer's assistant until that individual has:

(1) Received copies of, and instruction in, the applicable operating and emergency procedures and has been instructed in the use of sources of radiation and radiation survey instruments of the registrant or licensee.

(2) Demonstrated that, under direct personal supervision of a radiographer, the individual is competent to use sources of radiation and radiation survey instruments as evidenced by the successful completion of a written or oral test and a field examination on the subjects relevant to being an assistant radiographer.

(c) Records of the training required under subsections (a) and (b), including copies of written tests, dates of oral tests and field examinations, shall be maintained for inspection by the Department for 3 years following termination of employment by the individual or until the registration or license is terminated.

Cross References

This section cited in 25 Pa. Code § 225.73 (relating to training and testing).

§ 225.75. Audits and safety reviews of radiographers and radiographer's assistants.

(a) The registrant or licensee shall review and provide for the safety and ongoing training needs of radiographers and radiographer's assistants at least once during each calendar year.

(b) The registrant or licensee shall conduct an annual inspection program of the job performance of each radiographer and radiographer's assistant to ensure that operating and emergency procedures and this article and registration or license requirements for the registrant or licensee are followed. This audit program shall:

(1) Include observation of the performance of each radiographer and radiographer's assistant during an actual radiographic operation at intervals not to exceed 1 calendar year.

(2) Provide that, if a radiographer or radiographer's assistant has not participated in a radiographic operation for more than 6 months since the last annual inspection, the individual's performance shall be observed and recorded when the individual next participates in a radiographic operation.

(c) The registrant or licensee shall maintain records of the training set forth in subsection (b) to include certification documents, written and field examinations, annual safety reviews and annual audits of job performance. Records shall be available for inspection by the Department for 3 years following the termination of employment of the individual or until the registration or license is terminated.

§ 225.76. Reporting requirements.

(a) In addition to the reporting requirements in §§ 219.221 and 219.222 (relating to reports of stolen, lost or missing licensed or registered sources of radiation; and notification of incidents and reportable events), each registrant or licensee shall provide to the Department, within 30 days of its occurrence, a written report on any of the following incidents involving machines or equipment used in radiographic operations:

(1) The inability to terminate irradiation from a radiation producing machine.

(2) An interlock failure during shielded room radiography.

(b) The registrant or licensee shall include the following information in each report submitted under subsection (a):

(1) A description of the equipment problem.

(2) The cause of the incident, if known or determined.

(3) The manufacturer and model number of the equipment involved.

(4) The place, date and time of the incident.

- (5) Actions taken to reestablish normal operations.
 - (6) Corrective actions taken or planned to prevent reoccurrence.
 - (7) The names and qualifications of personnel involved.
- (c) Reports of overexposures, required under 10 CFR 20.2202 (relating to notification of incidents) or of excessive exposures, required under 10 CFR 20.2203 (relating to reports of exposures, radiation levels and concentrations of radioactive material exceeding the limits) which involve the failure of safety components of radiography equipment shall also include, to the extent known, the information specified under subsection (b). Complete information required in subsection (b) shall be available in the 30-day follow-up report rule under 10 CFR 20.2203(a).

GENERAL TECHNICAL REQUIREMENTS

§ 225.81. Permanent radiographic installations.

(a) Permanent radiographic installations having high radiation area entrance controls of the types described in 10 CFR 20.1601 and 20.1902 (relating to control of access to high radiation areas; and posting requirements) shall also meet the following requirements.

(1) Each entrance that is used for personnel access to the high radiation area in a permanent radiographic installation shall have both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be activated by radiation whenever the X-ray source is energized. The audible signal shall be actuated when an attempt is made to enter the installation while the X-ray source is energized.

(2) The entrance control device or alarm system shall be tested for proper function prior to beginning operations on each day of use.

(3) The radiographic exposure system may not be used if an entrance control device or alarm system is not operating properly. If an entrance control device or alarm system is not functioning properly, it shall be removed from service and repaired or replaced immediately. If no replacement is available, the facility may continue to be used provided that the registrant implements the continuous surveillance under 10 CFR 34.51 and 34.52 (relating to surveillance; posting), § 225.83 (relating to operating requirements) and uses an alarming ratemeter. Before the entrance control device or alarm system is returned to service, the radiation safety officer or an individual designated by the radiation safety officer shall validate the repair.

(b) Records of the tests performed under subsection (a) shall be maintained for inspection by the Department for 3 years.

§ 225.82. Operating requirements.

(a) When radiographic operations are performed at a location other than a permanent radiographic installation, a minimum of two radiographic personnel

shall be present to operate the X-ray device. At least one of the radiographic personnel shall be qualified as a radiographer. The other individual may be either a radiographer or a radiographer's assistant.

(b) Other than a radiographer, or a radiographer's assistant who is under the personal supervision of a radiographer, an individual may not manipulate the controls or operate the equipment used in industrial radiographic operations.

(c) At each job site, the following shall be supplied by the registrant or licensee:

- (1) The appropriate barrier ropes and warning signs.
- (2) At least one operable, calibrated radiation survey instrument.
- (3) For each worker requiring monitoring, an individual personnel dosimeter that is processed and evaluated by an NVLAP processor.
- (4) An operable, calibrated direct reading dosimeter with a range of zero to 51.6 $\mu\text{C/kg}$ (200 milliroentgen) for each worker requiring monitoring.

(d) An industrial radiographic operation may not be performed if any of the items in subsection (c) is not available at the job site or is inoperable.

§ 225.83. Records required at temporary job sites.

Each registrant or licensee conducting radiographic operations at a temporary job site shall maintain and have available for inspection by the Department at that job site, the following records or documents:

- (1) The certificate of registration, license or equivalent document which authorizes radiographic operations, and radiographic personnel certifications.
- (2) Operating and emergency procedures.
- (3) Relevant regulations of the Department.
- (4) Survey records required under this chapter for the period of operation at the site.
- (5) Daily direct reading dosimeter records for the period of operation at the site.
- (6) The current radiation survey meter calibration records for meters in use at the site. Acceptable records include tags or labels that are affixed to the survey meter.

Cross References

This section cited in 25 Pa. Code § 225.81 (relating to permanent radiographic installations).

§ 225.84. Operating and emergency procedures.

The operating and emergency procedures of the registrant or licensee shall include instruction in at least the following:

- (1) Handling and use of sources of radiation to be employed so that no individual is likely to be exposed to radiation in excess of the limits established in Chapter 219 (relating to standards for protection against radiation).

- (2) Methods and occasions for conducting radiation surveys and the proper use of survey meters.
- (3) Methods for controlling access to areas where radiographic operations are being conducted.
- (4) Methods and occasions for locking and securing sources of radiation.
- (5) Personnel monitoring and the use of individual monitoring devices, including steps that are to be taken immediately by radiographic personnel when a direct reading dosimeter is found to be off-scale.
- (6) Methods and procedures for minimizing exposure to individuals in the event of an accident.
- (7) The procedure for notifying proper personnel in the event of an accident.
- (8) Maintenance of records required by the Department.
- (9) The inspection and maintenance of radiation-producing machines and survey meters.

§ 225.85. Surveys and survey records.

- (a) A survey with a calibrated radiation survey instrument shall be made after each radiographic exposure to determine that the emission of radiation has terminated.
- (b) Records of the surveys required by subsection (a) shall be maintained (for inspection by the Department) for 3 years. If the survey has been used to determine an individual's exposure, the records of the survey shall be maintained until the Department terminates the registration or license.

§ 225.86. Utilization logs.

A registrant or licensee shall maintain current logs, which shall be kept available for inspection by the Department for 3 years from the date of the event, showing for each radiation-producing machine, the following applicable information:

- (1) The identity (name and signature) of the operator to whom the radiation-producing machine is assigned.
- (2) The model and serial number of the radiation-producing machine.
- (3) The locations and dates of use.
- (4) The technique factors (tube kilovoltage, tube current, exposure time) used for each radiographic exposure.

§ 225.87. Security.

During each radiographic operation, the radiographer or radiographer's assistant shall maintain direct surveillance of the operation to protect against unauthorized entry into a high radiation area, except when one of the following exists:

(1) The high radiation area is equipped with a control device or an alarm system as described in 10 CFR 20.1601 and 20.1902(b) (relating to control of access to high radiation areas; and posting of high radiation areas).

(2) The high radiation area is locked to protect against unauthorized or accidental entry.

§ 225.88. Posting.

Areas in which radiographic operations are being performed shall be conspicuously posted as required by 10 CFR 20.1902 (relating to posting requirements).

**RADIATION SURVEY INSTRUMENT AND PERSONNEL
MONITORING REQUIREMENTS**

§ 225.91. Radiation survey meter requirements.

(a) A registrant or licensee shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by this chapter and Chapter 219 (relating to standards for the protection against radiation).

(b) A radiographic operation may not be conducted unless calibrated and operable radiation survey instrumentation is available and used at each site where radiographic operations are conducted.

(c) Immediately prior to first use at a site where radiographic operations are conducted and at the beginning of work shift changes thereafter, a radiation survey instrument shall be checked to ensure that it is operating properly by exposing the instrument to a reference source of radiation and observing its response. Instruments that fail to respond as expected may not be used.

Cross References

This section cited in 25 Pa. Code § 225.92 (relating to radiation survey meter calibration requirements).

§ 225.92. Radiation survey meter calibration requirements.

(a) In addition to the requirements of § 225.91 (relating to survey meter requirements), instruments required by this chapter shall have a range so that 0.516 $\mu\text{C}/\text{kg}$ (2 mR) per hour through 258 $\mu\text{C}/\text{kg}$ (1 R) per hour can be measured.

(b) Each radiation instrument shall be calibrated:

- (1) At energies appropriate for use.
- (2) At intervals not to exceed 6 months.
- (3) After each instrument servicing, other than battery replacement.
- (4) To within an accuracy of +/- 20%.
- (5) At two points located approximately one-third and two-thirds of full scale on each scale of linear scale instruments; at mid-range of each decade and

at two points of at least 1 decade for logarithmic scale instruments; and for digital instruments, at three points between 0.516 $\mu\text{C}/\text{kg}$ (2 mR) and 258 $\mu\text{C}/\text{kg}$ (1000 mR) per hour.

(6) By a person authorized by the Department, the NRC or an agreement state.

(c) Calibration records shall be maintained for inspection by the Department for 3 years after the date of calibration.

§ 225.93. Personnel monitoring control.

(a) The registrant or licensee may not permit an individual to act as a radiographer or as a radiographer's assistant unless, at all times during radiographic operations, each individual wears a direct reading dosimeter and a personnel dosimeter that is processed and evaluated by an NVLAP processor.

(1) Personnel monitoring devices used to determine compliance with dose limits for the whole body shall be worn on the trunk of the body over the area most likely to receive exposure.

(2) This does not relieve the registrant or licensee from providing peripheral monitoring devices such as ring finger TLDs when appropriate.

(3) Each personnel monitoring device shall be assigned to and worn by only one individual.

(b) Film badges shall be replaced at intervals not to exceed 1 month. Other personnel dosimeters processed and evaluated by an accredited NVLAP processor shall be replaced at intervals not to exceed 3 months.

(c) Direct reading dosimeters shall meet the criteria as in ANSI N13.5-1972, "Performance Specifications for Direct Reading and Indirect Reading Pocket Dosimeters for X- and Gamma-Radiation" published in 1972, exclusive of subsequent amendments or additions.

(d) The use of DRDs is subject to the following requirements:

(1) DRDs shall have a range of zero to 51.6 $\mu\text{C}/\text{kg}$ (200 mR) and shall be zeroed at the start of each work shift.

(2) As a minimum, at the beginning and the end of each worker's shift involving the use of a source of radiation, DRDs shall be read and the exposure values recorded.

(3) Direct reading dosimeters shall be checked for correct response to radiation at periods not to exceed 1 year. A dosimeter may not be used for personnel monitoring unless the response is accurate within $\pm 20\%$ of the true radiation exposure. Records of dosimeter response checks shall be maintained for inspection by the Department for 3 years.

(4) If an individual's DRD indicates exposure that is "off-scale" beyond the range it can measure, industrial radiographic operations by that individual shall cease immediately and the individual's personnel dosimeter shall be sent immediately for processing. The individual may not use any sources of radiation until the individual's radiation dose has been determined.

(e) Data on personnel exposure reported or recorded from personnel monitoring devices shall be kept for inspection by the Department until the certificate of registration or license is terminated or until the Department authorizes their disposition, in writing, following a determination by the Department that the records contain inaccurate personnel monitoring information.

RADIATION-PRODUCING MACHINE REQUIREMENTS

§ 225.101. Cabinet X-ray systems and baggage/package X-ray systems.

(a) Cabinet and baggage/package X-ray systems that are certified under 21 CFR Chapter I, Subchapter J, Radiological Health, shall also meet the requirement of 21 CFR 1020.40 (relating to cabinet X-ray systems).

(b) A cabinet X-ray system may not be energized unless all openings are securely closed and exposure to radiation from the system does not exceed the limits in 10 CFR 20.1301 (relating to dose limits for individual members of the public). Each access door to the cabinet shall have an interlock that terminates the exposure whenever the door is opened. The enclosure shall be shielded so that every location on the exterior meets the conditions for an unrestricted area.

(c) A registrant may not permit an individual to operate a cabinet X-ray system until the individual has received a copy of, and instruction in, the operating procedures for the X-ray system and has demonstrated competency in the use of the cabinet X-ray system and an understanding of the operating procedures.

(d) The registrant shall evaluate the cabinet X-ray system to assure compliance with 10 CFR 20.1301 and 21 CFR 1020.40 if the system is a certified cabinet X-ray system. Records of these evaluations shall be maintained for inspection by the Department while the system is in the possession of the registrant or until the evaluation is replaced by an update following modifications.

(e) The registrant shall test on-off switches, interlocks and safety devices at intervals not exceeding 1 year, and make repairs as necessary to maintain all safety features including warning labels. Records of these tests shall be maintained for inspection by the Department for 3 years.

(f) Cabinet X-ray systems and baggage/package X-ray systems are exempt from all other provisions of this chapter.

Cross References

This section cited in 25 Pa. Code § 225.104 (relating to X-ray detection systems for explosives, weapons and illegal items).

§ 225.102. Shielded room X-ray radiography.

(a) A room used for shielded room X-ray radiography shall be shielded so that every location on the exterior meets conditions for an unrestricted area and the only access to the room is through openings which are interlocked so that the

radiation source will not operate unless all openings are securely closed and meet the requirements of 10 CFR 20.1601 (relating to control of access to high radiation areas).

(b) The registrant shall provide personnel monitoring equipment to every individual who operates, positions material for irradiation, or performs maintenance on a radiation-producing machine for shielded room X-ray radiography.

(c) The operator shall conduct a physical radiation survey to determine that the radiation source is deenergized prior to each entry into the radiographic exposure area.

§ 225.103. Temporary job site radiography.

(a) The operator shall conduct a physical radiation survey to determine that the radiation source is de-energized prior to each entry into the radiographic exposure area. Survey results and records of the boundary location shall be maintained and kept available for inspection by the Department for 3 years.

(b) Mobile or portable radiation producing machines shall be physically secured to prevent tampering or removal by unauthorized personnel.

§ 225.104. X-ray detection systems for explosives, weapons and illegal items.

(a) This section applies to X-ray systems that produce an image that may be used to screen for the presence of explosive devices or components, weapons, contraband or prohibited items. This section does not apply to cabinet and baggage/package X-ray systems covered under § 225.101 (relating to cabinet X-ray systems and baggage/package X-ray systems).

(b) An X-ray system used for detection of explosives, weapons or illegal items may not be used on human beings or animals without specific permission of the Department. X-ray systems that irradiate human beings for medical diagnosis are covered under Chapter 221 (relating to human use of X-ray machines). X-ray systems that irradiate animals for diagnosis or therapy are covered under Chapter 223 (relating to veterinary medicine).

(c) Radiographic X-ray detection systems shall conform to the following:

(1) The leakage radiation from the source assembly measured at a distance of 1 meter in any direction from the source may not exceed 25.8 $\mu\text{c}/\text{kg}$ (100 mR) in 1 hour when the X-ray tube is operated at its leakage technique factors. Compliance shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters.

(2) Portable X-ray systems shall be equipped with collimators which are capable of restricting the useful beam to the area of interest. Collimators shall provide the same degree of protection required in paragraph (1).

(3) A means shall be provided to terminate the exposure after a preset time, a preset to image receptor or a preset product of exposure time and tube current.

(4) The X-ray control shall have a dead-man type exposure switch.

(5) The X-ray controls shall indicate the technique factors, (that is, kilovoltage, tube current and exposure time or the product of tube current and exposure time).

(6) The X-ray machine shall be labeled with a readily discernible sign bearing the radiation symbol and the words, "CAUTION RADIATION—THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED" or words having a similar intent, near any switch that energizes the X-ray tube.

(7) For fixed radiographic equipment, an easily visible warning light shall be located adjacent to the X-ray tube and labeled with the words "X-RAY ON" or words having a similar intent. The warning light shall be illuminated only when the X-ray tube is energized or only when the shutter is open.

(d) Fluoroscopic X-ray detection systems shall conform to the following:

(1) The leakage radiation from the source assembly measured at a distance of 1 meter in any direction from the source may not exceed 25.8 $\mu\text{c}/\text{kg}$ (100 mR) in 1 hour when the X-ray tube is operated at its leakage technique factors. Compliance shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters.

(2) The X-ray machine shall be labeled with a readily discernible sign bearing the radiation symbol and the words, "CAUTION RADIATION—THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED" or words having a similar intent, near any switch that energizes the X-ray tube.

(3) To the extent practicable, the X-ray system (X-ray tube, imaging system and the object being irradiated) shall be completely enclosed so that every location on the exterior meets conditions for an unrestricted area and the only access to the room or enclosure is through openings which are interlocked so that the radiation source will not operate unless all openings are securely closed and meet the requirements of 10 CFR 20.1601 (relating to control of access to high radiation areas).

(4) The equipment shall be constructed so that, under conditions of normal use, the entire cross-section of the useful beam shall be attenuated by a primary protective barrier permanently incorporated into the equipment.

(5) The X-ray control shall have a dead-man type exposure switch. Activation of the X-ray beam shall be possible only by continuous pressure on the exposure switch.

(6) An easily visible warning light shall be located adjacent to the X-ray tube or on the outside of the enclosure and be labeled with the words "X-RAY ON" or words having a similar intent. This light shall be illuminated only when the X-ray tube is energized or only when the shutter is open.

(e) Operating procedures for portable radiographic X-ray detection systems are as follows:

(1) To the extent practicable, portable X-ray tube heads shall be supported by a stand.

(2) To the extent practicable, supporting or positioning devices for the image receptor shall be used during radiation exposures.

(3) Individuals, other than those whose presence is necessary to conduct the X-ray procedure, shall be located at least 2 meters away from the X-ray tube and the object being irradiated during exposures.

(4) An individual may not be regularly employed to support the image receptor or object during radiation exposures.

(f) Operating procedures for fixed radiographic X-ray detection systems are as follows:

(1) A registrant shall test the safety and warning devices, including interlocks, at intervals not to exceed 12 months. Test records shall be maintained for inspection by the Department for 3 years after the test has been conducted.

(2) Safety or warning devices that do not function properly shall be repaired in a timely manner.

(3) If an X-ray detection system is required to be operated while in need of repair, procedures shall be modified to maintain the design level equivalent of safety or else the equipment may not be used.

APPENDIX A**Subjects to be Covered During the
Instruction of Radiographers**

- I. *Fundamentals of Radiation Safety*
 - A. Characteristics of radiation
 - B. Units of radiation dose and quantity of radioactivity
 - C. Significance of radiation dose
 - 1. Radiation protection standards
 - 2. Biological effects of radiation dose
 - D. Levels of radiation from radiation sources
 - E. Methods of controlling radiation dose
 - 1. Working time
 - 2. Working distances
 - 3. Shielding
- II. *Radiation Detection Instrumentation to be Used*
 - A. Use of radiation survey instruments
 - 1. Operation
 - 2. Calibration
 - 3. Limitations
 - B. Survey techniques
 - C. Use of personnel monitoring equipment
 - 1. Film badges
 - 2. Thermoluminescent dosimeters
 - 3. Pocket dosimeters
- III. *Radiographic Equipment to be Used*
 - A. Remote handling equipment
 - B. Radiographic exposures devices and sealed sources
 - C. Storage containers
 - D. Operation and control of X-ray equipment
- IV. *The Requirements of Pertinent Federal and State Regulations*
- V. *The Licensee's or Registrant's Written Operating and Emergency Procedures*
- VI. *Inspection and Maintenance Performed by the Radiographers*
- VII. *Case Histories of Radiography Incidents*

Source

The provisions of this Appendix A adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235.

[Next page is 226-1.]

225-22

**CHAPTER 226. LICENSES AND RADIATION SAFETY
REQUIREMENTS FOR WELL LOGGING**

GENERAL

Sec.	
226.1.	Purpose and scope.
226.2.	[Reserved].
226.3.	[Reserved].
226.3a.	Abandonment of a sealed source.
226.4.	Incorporation by references.
226.5.	Effect of incorporation of 10 CFR Part 39.
226.11.	[Reserved].
226.12.	[Reserved].
226.13.	[Reserved].
226.14.	[Reserved].
226.15—226.19.	[Reserved].
226.21—226.23.	[Reserved].
226.31—226.33.	[Reserved].
226.34.	[Reserved].
226.41—226.43.	[Reserved].
226.51.	[Reserved].

PARTICLE ACCELERATORS

226.61. Particle accelerators.

Authority

The provisions of this Chapter 226 issued and amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. § 7110.301 and § 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 226 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 78.111 (relating to abandonment); 25 Pa. Code § 215.32 (relating to exemption qualifications); and 25 Pa. Code § 217.1 (relating to purpose and scope).

GENERAL

§ 226.1. Purpose and scope.

This chapter establishes radiation safety requirements for persons using radiation sources for well logging in a single well, radioactive markers, uranium sinker bars and subsurface tracer studies. Persons who use radiation sources for well

logging operations shall comply with this chapter, which is in addition to and not in substitution for other applicable requirements of this article, in particular, the requirements of Chapters 215, 217—220, 228 and 230.

Source

The provisions of this § 226.1 amended September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203978).

§ 226.2. [Reserved].

Source

The provisions of this § 226.2 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203978) to (203979).

§ 226.3. [Reserved].

Source

The provisions of this § 226.3 adopted December 18, 1987, effective December 19, 1987, 17 Pa. B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203979).

§ 226.3a. Abandonment of a sealed source.

In addition to incorporation by reference of 10 CFR Part 39 (relating to licenses and radiation safety requirements for well logging), the requirements of § 78.111 (relating to abandonment) shall also be met.

Source

The provisions of this § 226.3a adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 226.4. Incorporation by reference.

(a) Except as provided in this chapter, the requirements of 10 CFR Part 39 (relating to licenses and radiation safety requirements for well logging) are incorporated by reference.

(b) Notwithstanding the requirements incorporated by reference, 10 CFR 39.5, 39.8, 39.101 and 39.103 are not incorporated by reference.

Source

The provisions of this § 226.4 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 226.5. Effect of incorporation of 10 CFR Part 39.

To reconcile differences between this chapter and the incorporated sections of 10 CFR Part 39, the following words and phrases shall be substituted for the language in 10 CFR Part 39 as follows:

- (1) A reference to “NRC” or “Commission” means Department.
- (2) A reference to “NRC or agreement state” means Department, NRC or agreement state.
- (3) The definition of “sealed source” includes NARM.
- (4) The definition of “licensed material” includes NARM.
- (5) Notifications, reports and correspondence referenced in the incorporated parts of 10 CFR shall be directed to the Department and, for NRC licenses, to the NRC until agreement state status is in effect.

Source

The provisions of this § 226.5 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 226.11. [Reserved].

Source

The provisions of this § 226.11 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203979) to (203980).

§ 226.12. [Reserved].

Source

The provisions of this § 226.12 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203980).

§ 226.13. [Reserved].

Source

The provisions of this § 226.13 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203980).

§ 226.14. [Reserved].

Source

The provisions of this § 226.14 adopted December 18, 1987, effective December 19, 1987, 17 Pa. B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203980) to (203981).

§§ 226.15—226.19. [Reserved].

Source

The provisions of these §§ 226.15—226.19 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203982) to (203984).

§§ 226.21—226.23. [Reserved].**Source**

The provisions of these §§ 226.21—226.23 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203984) to (203985).

§§ 226.31—226.33. [Reserved].**Source**

The provisions of these §§ 226.31—226.33 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203985).

§ 226.34. [Reserved].**Source**

The provisions of this § 226.34 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203985) to (203986).

§§ 226.41—226.43. [Reserved].**Source**

The provisions of these §§ 226.41—226.43 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203986) to (203987).

§ 226.51. [Reserved].**Source**

The provisions of this § 226.51 adopted December 18, 1987, effective December 19, 1987, 17 Pa. B. 5235; amended June 19, 1992, effective June 20, 1992, 22 Pa. B. 3135; reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (203987) to (203989).

PARTICLE ACCELERATORS**§ 226.61. Particle accelerators.**

(a) A licensee or registrant may not permit aboveground testing of particle accelerators designed for use in well logging which results in the production of radiation, except in areas or facilities controlled or shielded so that the requirements of 10 CFR 20.1301 (relating to radiation dose to dose limits for individual members of the public) are met.

(b) The use of particle accelerators for well logging shall be conducted under the licensing provisions of Chapter 228 (relating to radiation safety requirements for particle accelerators).

Source

The provisions of this § 226.61 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

APPENDIX A. [Reserved]**Source**

The provisions of this Appendix A reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203990).

APPENDIX B. [Reserved]**Source**

The provisions of this Appendix B reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (203991).

[Next page is 227-1.]

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**CHAPTER 227. RADIATION SAFETY REQUIREMENTS FOR
ANALYTICAL X-RAY EQUIPMENT, X-RAY GAUGING EQUIPMENT,
ELECTRON MICROSCOPES AND X-RAY CALIBRATION SYSTEMS**

GENERAL PROVISIONS

- Sec.
227.1. Purpose and scope.
227.2. Definitions.
227.3. [Reserved].

ANALYTICAL X-RAY EQUIPMENT

- 227.11. [Reserved].
227.11a. Equipment requirements.
227.12. [Reserved].
227.12a. Area requirements.
227.13. [Reserved].
227.13a. Operating requirements.
227.14. Personnel requirements.
227.15. [Reserved].

X-RAY GAUGING EQUIPMENT

- 227.21. Warnings.
227.22. Radiation levels.
227.23. Personnel requirements.
227.24. [Reserved].
227.25. [Reserved].

ELECTRON MICROSCOPES

- 227.31. Warnings.
227.32. Radiation levels.
227.33. Personnel requirements.
227.41. [Reserved].
227.42. [Reserved].
227.43. [Reserved].
227.44. [Reserved].
227.51. [Reserved].
227.52. [Reserved].
227.53. [Reserved].
227.61. [Reserved].
227.62. [Reserved].
227.63. [Reserved].

- 227.64. [Reserved].
- 227.65. [Reserved].
- 227.66. [Reserved].
- 227.67. [Reserved].
- 227.68. [Reserved].
- 227.69. [Reserved].
- 227.70. [Reserved].
- 227.71. [Reserved].
- 227.81. [Reserved].
- 227.82. [Reserved].
- 227.83. [Reserved].
- 227.84. [Reserved].
- 227.85. [Reserved].
- 227.91. [Reserved].
- 227.92. [Reserved].
- 227.93. [Reserved].
- 227.94. [Reserved].
- 227.95. [Reserved].
- 227.96. [Reserved].
- 227.97. [Reserved].

X-RAY CALIBRATION SYSTEMS

- 227.101. Scope.
- 227.102. Area requirements.
- 227.103. Operating requirements.
- 227.104. Personal requirements.

Authority

The provisions of this Chapter 227 issued under section 301 of The Atomic Energy Development and Radiation Control Act (73 P. S. § 1301) (Repealed); and amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 227 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualifications); 28 Pa. Code § 501.4 (relating to regulations); and 28 Pa. Code § 565.12 (relating to radiology service policy).

GENERAL PROVISIONS

§ 227.1. Purpose and scope.

This chapter establishes the requirements for the use of analytical X-ray equipment, X-ray gauging equipment, electron microscopes and X-ray calibration sys-

tems. Registrants who use analytical X-ray equipment, X-ray gauging equipment, electron microscopes or X-ray calibration systems shall comply with this chapter. The requirements of this chapter are in addition to, and not in substitution for, other applicable provisions of this article.

Source

The provisions of this § 227.1 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282. Immediately preceding text appears at serial page (249334).

§ 227.2. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Analytical X-ray machine—An assembly of components utilizing X-rays to determine the elemental or chemical composition or to examine the microstructure of materials usually by X-ray diffraction or fluorescence.

Electron microscope—Equipment utilizing the wave characteristics of electrons that have been accelerated by an electric field to visualize the microscopic structure of material.

Fail-safe characteristics—A design feature which causes X-ray production to cease, beam port shutters to close or otherwise prevents emergence of the primary beam, upon the failure of a safety or warning device.

Local components—Parts of an analytical X-ray system, such as radiation source housings, port and shutter assemblies, collimators, sample holders, cameras, goniometers, detectors and shielding, that contain or are in the path of the X-ray beam. The term does not include power supplies, transformers, amplifiers, readout devices and control panels.

Open-beam configuration—An analytical X-ray system in which the beam is not enclosed or shielded so any portion of an individual's body could accidentally be placed in the beam path during normal operation.

Operating procedures—Step-by-step instructions necessary to accomplish the analysis.

Primary beam—Radiation which passes through an aperture of the source housing by a direct path from the X-ray tube or a radioactive source located in the radiation source housing.

X-ray calibration systems—Radiation-producing machines and equipment used to calibrate radiation detection or measuring devices.

X-ray gauging equipment—A machine utilizing X-rays to detect, measure, gauge or control thickness, density, level or interface location.

Source

The provisions of this § 227.2 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282. Immediately preceding text appears at serial page (249335).

§ 227.3. [Reserved].**Source**

The provisions of this § 227.3 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (119234) and (4919).

ANALYTICAL X-RAY EQUIPMENT**§ 227.11. [Reserved].****Source**

The provisions of this § 227.11 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (203996).

§ 227.11a. Equipment requirements.

(a) Open-beam configurations shall have a device which either prevents the entry of any portion of an individual's body into the primary X-ray beam path, or causes the beam to be terminated or interrupted upon entry into the path. A registrant may apply to the Department for an exemption from the requirement of a safety device. The application for an exemption shall include the following:

- (1) A description of the various safety devices that have been evaluated.
- (2) The reason each of these devices cannot be used.
- (3) A description of the alternative methods that will be employed to minimize the possibility of an accidental exposure, including procedures to assure that operators and others in the area will be informed of the absence of safety devices.

(b) Open-beam configurations shall be provided with a readily discernible indication of one or both of the following:

- (1) X-ray tube status (on-off) located near the radiation source housing, if the primary beam is controlled in this manner.
- (2) Shutter status (open-closed) located near each port on the radiation source housing, if the primary beam is controlled in this manner.

(c) Warning devices shall be labeled so that their purpose is easily identified. In addition, equipment manufactured after December 17, 1987, shall have fail-safe characteristics.

(d) An easily visible warning light located immediately adjacent to the tube head or port and labeled with the words "X-ray on," or words containing a similar warning, shall be provided and shall be illuminated when the X-ray tube is energized.

(e) Unused ports on radiation source housings shall be secured in the closed position in a manner which will prevent casual opening.

(f) Analytical X-ray equipment shall be labeled with a readily discernible sign bearing the radiation symbol and both of the following:

(1) "CAUTION—HIGH INTENSITY X-RAY BEAM" or words having a similar intent on the X-ray source housing.

(2) "CAUTION RADIATION—THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED," or words having a similar intent, near any switch that energizes an X-ray tube.

(g) On equipment with an open-beam configuration manufactured and installed after December 19, 1987, each port on the radiation source housing shall be equipped with a shutter that cannot be opened unless a collimator or coupling has been connected to the port.

(h) Equipment exclusively designed and exclusively used for vacuum spectroscopy where the tube housing and sample chamber is located behind all external surfaces of the unit shall be exempt from the requirements of this section, §§ 227.12a and 227.13a (relating to area requirements; and operating requirements), but shall meet the requirements of § 227.14 (relating to personnel procedures) and the following:

(1) The unit shall be designed so that when the unit is operating at the maximum kilovoltage and current ratings, the leakage radiation will not be in excess of 0.5 milliroentgens (.129 $\mu\text{C/kg}$) per hour at a distance of 4 centimeters from any external surface.

(2) Radiation surveys using appropriate radiation survey equipment shall be performed on the analytical X-ray unit upon installation, after moving the unit to a new location, and after maintenance or repair requiring the disassembly or removal of a local component or radiation shielding.

(3) Safety and warning devices shall be tested for proper operation at least annually. If the test reveals that a safety or warning device is not working properly, the unit may not be operated until the warning device is repaired or replaced.

(4) Records of all tests and surveys sufficient to show compliance with subsection (h) shall be maintained and kept available for inspection by the Department for 4 years.

(5) A sign bearing the radiation symbol and the words "CAUTION RADIATION—THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED," or words of similar intent shall be placed next to any switch or device that activates the X-ray tube.

(6) A sign bearing the radiation symbol and the words "CAUTION—RADIATION," or words of similar intent shall be placed next to the opening of the sample chamber.

Authority

The provisions of this § 227.11a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 227.11a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

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§ 227.12. [Reserved].**Source**

The provisions of this § 227.12 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (203997).

§ 227.12a. Area requirements.

(a) The source housing construction shall be of a type that when all the shutters are closed and the source is in any possible operating mode, the leakage radiation will not be in excess of 2.5 milliroentgens (.645 $\mu\text{C}/\text{kg}$) per hour at a distance of 5 centimeters from the housing surface.

(b) The X-ray generator shall have a protective cabinet constructed so that the leakage radiation will not be in excess of 0.5 milliroentgen (.129 $\mu\text{C}/\text{kg}$) per hour at a distance of 5 centimeters from the housing surface.

(c) The local components of an analytical X-ray system shall be located and arranged and shall include sufficient shielding or access control so that no radiation levels exist in any area surrounding the local component group which could result in a dose to an individual present therein in excess of the limits given in § 219.51 (Reserved). For systems utilizing X-ray tubes, these requirements shall be met at any specified tube rating.

(d) To show compliance with subsections (a)—(c), the registrant shall perform radiation surveys:

- (1) Upon installation of the equipment and at least every 12 months thereafter.
- (2) Following a change in the initial arrangement, number or type of local components in the system.
- (3) Following maintenance requiring the disassembly or removal of a local component in the system.
- (4) During the performance of maintenance and alignment procedures if the procedures require the presence of a primary X-ray beam when a local component in the system is disassembled or removed.
- (5) When a visual inspection of the local components in the system reveals an abnormal condition.
- (6) When personnel monitoring devices show a significant increase in radiation exposure over the previous monitoring period or the readings are approaching the radiation dose limits.
- (7) When the machine is operated in a manner other than the routine manner specified in § 227.13a (relating to operating requirements).

(e) The registrant shall test and inspect all safety and warning devices at least annually to insure their proper operation. If a safety or warning device is found

to be malfunctioning, the machine shall be removed from service until repairs to the malfunctioning device are completed.

(f) Records of surveys and tests sufficient to show compliance with this chapter shall be maintained for 4 years and kept available for inspection by the Department.

(g) The equipment used to conduct the surveys and tests required in this chapter shall be adequate to measure the radiation produced by the radiation source.

Authority

The provisions of this § 227.12a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 227.12a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 227.11a (relating to equipment requirements); and 25 Pa. Code § 227.14 (relating to personnel requirements).

§ 227.13. [Reserved].

Source

The provisions of this § 227.13 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial pages (203997) to (203998).

§ 227.13a. Operating requirements.

(a) Operating procedures shall be written and available to the analytical X-ray equipment operators. These procedures shall include instructions for sample insertion and manipulation, equipment alignment, routine maintenance and data recording procedures which are related to radiation safety. An individual may not operate analytical X-ray equipment in a manner other than that specified in the operating procedures unless the individual has obtained written approval from the radiation safety officer.

(b) An individual may not bypass or otherwise circumvent a safety device unless the individual has obtained the prior written approval of the radiation safety officer. The radiation safety officer may grant the permission only if the following conditions are met:

- (1) The radiation safety officer establishes administrative controls and procedures to assure the radiation safety of individuals working around the system.

(2) The period for the bypass of the safety device is not more than 30 days unless written permission is obtained from the Department for a longer period.

(3) A readily discernible sign bearing the words "SAFETY DEVICE NOT WORKING," or words containing a similar warning, is placed on the radiation source housing.

(c) Except as specified in subsection (b), an operation involving removal of covers, shielding materials or tube housings or modifications to shutters, collimators or beam stops may not be performed without ascertaining that the tube is off and will remain off until safe conditions have been restored. The main switch, rather than interlocks, shall be used for routine shutdown in preparation for repairs.

Authority

The provisions of this § 227.13a issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 227.13a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 227.11a (relating to equipment requirements); and 25 Pa. Code § 227.12a (relating to area requirements).

§ 227.14. Personnel requirements.

(a) An individual may not operate or maintain analytical X-ray equipment unless the individual has received instruction in and demonstrated competence as to:

- (1) Identification of radiation hazards associated with the use of the equipment.
- (2) Significance of the various radiation warning and safety devices incorporated into the equipment, or the reasons they have not been installed on certain pieces of equipment, and the extra precautions necessary if the devices are absent or bypassed.
- (3) Written operating procedures for the equipment.
- (4) Symptoms of an acute localized radiation exposure.
- (5) Procedures for reporting an actual or suspected exposure.
- (6) Use of survey and personnel monitoring equipment.

(b) Finger or wrist personnel monitoring devices shall be provided to and shall be used by:

- (1) Analytical X-ray equipment workers using systems having an open-beam configuration and not equipped with a safety device as described in § 227.12a(c) (relating to safety devices and requirements).

(2) Personnel maintaining analytical X-ray equipment if the maintenance procedures require the presence of a primary X-ray beam when a local component in the analytical X-ray system is disassembled or removed or when safety devices are bypassed.

(c) Reported dose values may not be used for the purpose of determining compliance with § 219.31 (relating to occupational dose limits for adults) unless they are evaluated by a qualified expert.

(d) The registrant or licensee shall notify the Department within 5 days of a suspected radiation overexposure to an individual from analytical X-ray machines. This notification is required even if subsequent investigation reveals no actual over-exposure actually occurred.

Authority

The provisions of this § 227.14 amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. 510-20).

Source

The provisions of this § 227.14 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; amended October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial pages (203998) to (203999).

Cross References

This section cited in 25 Pa. Code § 227.11a (relating to equipment requirements).

§ 227.15. [Reserved].

Source

The provisions of this § 227.15 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial pages (203999) to (204000).

X-RAY GAUGING EQUIPMENT

§ 227.21. Warnings.

X-ray gauging equipment shall be labeled with a readily discernable sign or signs bearing the radiation symbol and the words, "Caution Radiation—This Equipment Produces Radiation When Energized," or words containing a similar warning.

Source

The provisions of this § 227.21 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4922).

§ 227.22. Radiation levels.

An X-ray tube housing shall be constructed so that, with the unit in normal operation, the leakage radiation measured 5 centimeters from a surface is no more than 2.5 milliroentgens (645 nC/kg) per hour.

Source

The provisions of this § 227.21 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4922).

§ 227.23. Personnel requirements.

No registrant may permit an individual to operate or conduct maintenance upon X-ray gauging equipment until the individual has received a copy of and instruction in, and demonstrated an understanding of, the operating procedures necessary to ensure radiation safety.

Source

The provisions of this § 227.23 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4922) to (4923).

§ 227.24. [Reserved].**Source**

The provisions of this § 227.24 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4923) to (4924).

§ 227.25. [Reserved].**Source**

The provisions of this § 227.25 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4924) to (4937).

ELECTRON MICROSCOPES**§ 227.31. Warnings.**

An electron microscope shall be labeled with a readily discernable sign bearing the words, "Caution Radiation—This Equipment Produces Radiation When Energized," or words containing a similar warning.

Source

The provisions of this § 227.31 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4937).

§ 227.32. Radiation levels.

Radiation levels measured 5 centimeters from any accessible surface of an electron microscope may not exceed .5 milliroentgen (129 nC/kg) per hour.

Source

The provisions of this § 227.32 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; amended December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4938).

§ 227.33. Personnel requirements.

A registrant may not permit an individual to operate or conduct maintenance upon any electron microscope until the individual has received a copy of, instruction in, and demonstrated an understanding of, the operating procedures necessary to insure radiation safety.

Authority

The provisions of this § 227.33 amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20).

Source

The provisions of this § 227.33 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235; amended October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204002).

§§ 227.41—227.44. [Reserved].**Source**

The provisions of these §§ 227.41—227.44 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4938) to (4941).

§§ 227.51—227.53. [Reserved].**Source**

The provisions of these §§ 227.51—227.53 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4941) to (4942).

§§ 227.61—227.71. [Reserved].**Source**

The provisions of these §§ 227.61—227.71 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4942) to (4948).

§§ 227.81—227.85. [Reserved].**Source**

The provisions of these §§ 227.81—227.85 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial page (4949) to (4951).

§§ 227.91—227.97. [Reserved].**Source**

The provisions of these §§ 227.91—227.97 adopted February 1, 1972, effective February 2, 1972, 2 Pa.B. 212; reserved December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235. Immediately preceding text appears at serial pages (4951) to (4955).

X-RAY CALIBRATION SYSTEMS**§ 227.101. Scope.**

This section and §§ 227.102—227.104 apply to registrants who use X-ray producing machines to calibrate or test radiation detection or measuring devices.

Authority

The provisions of this § 227.101 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302).

Source

The provisions of this § 227.101 adopted November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282.

§ 227.102. Area requirements.

A room or enclosure used for testing or calibration shall be shielded so that every location on the exterior meets conditions for an unrestricted area, and the only access to the room or enclosure is through openings which are interlocked so that the radiation source will not operate unless all openings are securely closed and meet the requirements of 10 CFR 20.1601 (relating to control of access to high radiation areas).

Authority

The provisions of this § 227.102 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302).

Source

The provisions of this § 227.102 adopted November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282.

Cross References

This section cited in 25 Pa. Code § 227.101 (relating to scope).

§ 227.103. Operating requirements.

(a) The operator shall conduct a physical radiation survey to determine that the radiation machine X-ray tube is de-energized prior to each entry of any body part into the X-ray exposure area.

(b) As an alternative to subsection (a), the registrant may use an independent radiation monitoring system that displays the radiation intensity or displays when radiation levels have returned to their pre-irradiation levels.

Authority

The provisions of this § 227.103 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302).

Source

The provisions of this § 227.103 adopted November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282.

Cross References

This section cited in 25 Pa. Code § 227.101 (relating to scope).

§ 227.104. Personnel requirements.

A registrant may not permit an individual to operate or conduct maintenance on any X-ray calibration system until the individual has received a copy of, instruction in, and demonstrated an understanding of, the operating procedures necessary to ensure radiation safety.

Authority

The provisions of this § 227.104 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302).

Source

The provisions of this § 227.104 adopted November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282.

Cross References

This section cited in 25 Pa. Code § 227.101 (relating to scope).

[Next page is 228-1.]

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**CHAPTER 228. RADIATION SAFETY REQUIREMENTS FOR
PARTICLE ACCELERATORS****GENERAL PROVISIONS**

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Authority

The provisions of this Chapter 228 issued and amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. § 7110.301 and § 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 228 adopted December 18, 1987, effective December 19, 1987, 17 Pa.B. 5235, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualifications); 25 Pa. Code § 218.1 (relating to purpose and scope); 25 Pa. Code § 218.11 (relating to registration, renewal of registration and license fees); 25 Pa. Code § 225.1 (relating to purpose and scope); 25 Pa. Code § 226.1 (relating to purpose and scope); and 25 Pa. Code § 266.61 (relating to particle accelerators).

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GENERAL PROVISIONS**§ 228.1. Purpose and scope.**

This chapter establishes radiation safety requirements for persons utilizing particle accelerators for industrial, research or medical purposes. Persons who use particle accelerators shall comply with this chapter. The requirements in this chapter are in addition to and not in substitution for other applicable requirements of this article.

§ 228.2. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Accelerator—A radiation-producing machine that imparts kinetic energies of one of the following:

- (i) One-tenth of one MeV or greater to electrons if the electron beam is brought out of the evacuated region of the unit.
- (ii) One MeV or greater to electrons if the electrons are utilized for X-ray production.
- (iii) One-tenth of one MeV or greater to other particles.

Applicator—A structure which determines the extent of the treatment field at a given distance from the virtual source.

Beam-limiting device—A device providing a means to restrict the dimensions of the X-ray field.

Beam scattering filter—A filter used to scatter a beam of electrons.

Central axis of the beam—A line passing through the virtual source and the center of the plane figure formed by the edge of the first beam limiting device.

Dose monitoring system—A system of devices for the detection, measurement and display of quantities of radiation.

Dose monitor unit—A unit response from the dose monitoring system from which the absorbed dose can be calculated.

Existing equipment—Systems manufactured on or before October 3, 1998.

Field flattening filter—A filter used to provide dose uniformity over the area of a useful beam of X-rays at a specified depth.

Field size—The configuration of the radiation field along the major axes of an area in a plane perpendicular to the specified direction of the beam of incident radiation at the normal treatment distance and defined by the intersection of the major axes and the 50% isodose line.

Filter—Material placed in the useful beam to absorb the less penetrating radiation.

Isocenter—A fixed point in space located at the center of the smallest sphere through which the central axes of the beams pass.

Leakage radiation—Radiation emanating from the source assembly except for the following:

- (i) The useful beam.
- (ii) Radiation produced when the exposure switch or timer is not activated.

Moving beam therapy—Radiation therapy with relative displacement of the useful beam and the patient during irradiation.

New equipment—Systems manufactured after January 1, 1985.

Normal treatment distance—

- (i) For isocentric equipment, the isocenter.
- (ii) For nonisocentric equipment, the target to patient skin distance along the central axis as specified by the manufacturer.

Phantom—A volume of material behaving in a manner similar to tissue with respect to the attenuation and scattering of radiation.

Primary dose monitoring system—A system which will monitor the useful beam during irradiation and which will terminate irradiation when a preselected number of dose monitor units have been attained.

Qualified expert—An individual having the knowledge and training to measure ionizing radiation, to evaluate safety techniques and to advise regarding radiation protection needs. For example, individuals certified in the appropriate field by the American Board of Radiology, or the American Board of Health Physics or the American Board of Medical Physics or those having equivalent qualifications. With reference to the calibration of radiation therapy equipment, an individual having, in addition to the preceding qualifications, training and experience in the clinical applications of radiation physics to radiation therapy. For example, individuals certified in therapeutic radiological physics or X-ray and radium physics by the American Board of Radiology, or radiation oncology physics by the American Board of Medical Physics; or those having equivalent qualifications.

Radiation detector—A device which provides a signal or other indication suitable for measuring one or more quantities of incident radiation.

Radiation head—The structure from which the useful beam emerges.

Secondary dose monitoring system—A system which will terminate irradiation in the event of failure of the primary dose monitoring system.

Shadow tray—A device attached to the radiation head to support auxiliary beam limiting material.

Spot check—A procedure to assure that a previous calibration continues to be valid.

Stationary beam therapy—Radiation therapy without relative displacement of the useful beam and the patient during irradiation.

Subsystem—A combination of two or more components of an accelerator.

Target—The part of a radiation source which intercepts a beam of accelerated particles with subsequent emission of other radiation.

Tube housing assembly—The term includes high-voltage or filament transformers, or both, and other appropriate elements when contained within the tube housing.

Useful beam—The radiation which passes through the tube housing port and the aperture of the beam-limiting device when the exposure switch or timer is activated.

Virtual source—The nominal location of either the first scattering foil (for equipment providing electrons only) or the photon focal spot (for equipment capable of delivering both photons and electrons).

Wedge filter—An added filter effecting continuous progressive attenuation on all or part of the useful beam.

Source

The provisions of this § 228.2 amended October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204010).

§ 228.3. Sale and installation.

A person may not sell or install an accelerator that does not meet the provisions of this article.

Source

The provisions of this § 228.3 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

ADMINISTRATIVE CONTROLS

§ 228.11. [Reserved].

Source

The provisions of this § 228.11 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204010).

§ 228.11a. Licensee responsibilities.

(a) A person may not operate or permit the operation of an accelerator unless the accelerator and installation meet the applicable requirements of this article.

(b) Written safety procedures and rules shall be available at a facility, including restrictions of the operating technique required for the safe operation of the particular accelerator. The operator shall be able to demonstrate familiarity with the rules.

(c) An individual may not be exposed to the useful beam except for healing arts purposes. An exposure shall be authorized by a licensed practitioner of the healing arts.

(d) Exposure of a personnel monitoring device to deceptively indicate a dose delivered to an individual is prohibited.

Source

The provisions of this § 228.11a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.12. Information and maintenance record and associated information.

The licensee shall maintain records of surveys, calibrations, maintenance, machine malfunctions and modifications performed on the accelerators, including the names of persons who performed the services. The registrant or licensee shall keep these records for inspection by the Department for 4 years.

Source

The provisions of this § 228.12 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

NOTIFICATION AND LICENSING PROCEDURES**§ 228.21. [Reserved].****Source**

The provisions of this § 228.21 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204011).

§ 228.21a. Notification and license requirements.

(a) A person who intends to purchase, construct or acquire an accelerator shall notify the Department of this intent by filing an application for a specific license within 30 days after the initial order is issued to obtain any or all parts of the accelerator.

(1) The application shall be filed in duplicate on a form prescribed by the Department.

(2) The application shall contain pertinent information to permit the Department to evaluate the accelerator facility for compliance with the requirements of the act and this article.

(b) In addition to the notification requirement in subsection (a), a person who intends to install an accelerator shall notify the Department within 30 days after the initial construction or installation begins.

(c) Except as provided in subsection (d), a person may not operate a particle accelerator after October 3, 1998, without having obtained a license from the Department.

(d) A registrant possessing an accelerator before October 3, 1998, may continue to operate the accelerator provided an application for a license is filed in duplicate with the Department by October 4, 1999.

(e) The Department may, after the filing of an original application, and before the expiration of the license, require further information to enable the Department

to determine whether the application will be granted or denied or whether a license will be modified or revoked.

(f) The application shall be signed by the applicant or licensee or an individual authorized by the applicant or licensee.

Source

The provisions of this § 228.21a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.24a (relating to renewal of licenses); and 25 Pa. Code § 228.25a (relating to amendment of license at the request of the licensee).

§ 228.22. [Reserved].

Source

The provisions of this § 228.22 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204011).

§ 228.22a. Issuance of specific licenses.

(a) Upon determination that an application meets the requirements of the act and this article, the Department will issue a specific license authorizing the proposed activity and containing conditions and limitations as it deems appropriate or necessary.

(b) After the issuance of the license, the Department may, by appropriate regulations or order, incorporate additional requirements and conditions with respect to the licensee's receipt, possession, use and transfer of the accelerator subject to this chapter as it deems appropriate or necessary in order to:

- (1) Protect the public health and safety or property.
- (2) Prevent loss or theft of material subject to this chapter.

Source

The provisions of this § 228.22a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894; amended November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282. Immediately preceding text appears at serial page (249351).

§ 228.23. [Reserved].

Source

The provisions of this § 228.23 amended November 17, 1995, effective November 28, 1995, 25 Pa.B. 5085; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial pages (204011) to (204012).

§ 228.23a. Expiration and termination of a license.

(a) Except as provided in § 228.24a (relating to renewal of licenses), and subject to subsection (d)(5)(ii), a specific license expires on the date specified in the license. A license is effective for 5 years.

(b) A licensee shall notify the Department in writing when the licensee decides to permanently discontinue activities involving the accelerator authorized under the license and request termination of the license. The notification and request for termination shall include the reports and information specified in subsection (d)(3)—(5). The licensee is subject to subsections (d) and (e), as applicable, until termination.

(c) At least 30 days before the expiration date specified in a specific license, the licensee shall do one of the following:

(1) Submit an application for license renewal under § 228.24a.

(2) Notify the Department in writing if the licensee decides not to renew the license.

(d) If the licensee does not submit an application for license renewal under § 228.24a on or before the expiration date specified in the license, the licensee shall:

(1) Terminate the use of the accelerator.

(2) Properly dispose of incidental radioactive material generated by the operation of the accelerator.

(3) Submit a completed Department Form ER-BRP-314, "Certificate of Disposition of Materials," describing the disposition of materials in paragraph (2).

(4) Submit a radiation survey report to confirm the absence of radioactive materials or establish the levels of residual radioactive contamination unless the Department determines a radiation survey report is not necessary. This report shall include:

(i) The levels of beta and gamma radiation (in units of microrems or microsieverts, or in microrads or micrograys per hour) at 1 centimeter and gamma radiation at 1 meter from surfaces, levels of removable and fixed alpha, beta and gamma contamination on surfaces (in becquerels or microcuries per 100 square centimeters), and concentrations of contamination in soils (in units of picocuries or becquerels per gram) or in water (in units of picocuries or becquerels per liter) where soil and water concentrations are reported.

(ii) The survey instrumentation used to perform these surveys.

(5) Proceed with one of the following:

(i) Submit a certification that no detectable radioactive contamination was found if no residual contamination attributable to activities conducted

under the license is detected. If the information submitted under this section is adequate, the Department will notify the licensee in writing that the license is terminated.

(ii) Continue the license in effect beyond the expiration date. If necessary, with respect to possession of residual radioactive material present as contamination if detectable levels of residual radioactive contamination attributable to activities conducted under the license are found, until the Department notifies the licensee in writing that the license is terminated. During this time, the licensee shall comply with subsection (e), in addition to the information submitted under paragraphs (3) and (4) and this paragraph, the licensee shall submit a plan for decontamination, if necessary.

(e) A licensee who possesses residual radioactive material under subsection (d)(5)(ii) following the expiration date specified in the license, shall:

(1) Limit activities involving radioactive materials to those activities which are solely related to decontamination and other activities related to preparation for release for unrestricted use.

(2) Continue to control entry to restricted areas until the restricted areas are suitable for release for unrestricted use and until the Department notifies the licensee in writing that the license is terminated.

Source

The provisions of this § 228.23a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.24. [Reserved].

Source

The provisions of this § 228.24 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204012).

§ 228.24a. Renewal of licenses.

(a) An application for renewal of a specific license shall be filed under § 228.21a (relating to notification and license requirements).

(b) If a renewal application is filed prior to 30 days before the expiration of a license, the existing license does not expire until definitive notice has been given by the Department of its action on the renewal application. This subsection also applies to new license applications incorporating other licenses.

Source

The provisions of this § 228.24a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.23a (relating to expiration and termination of a license).

§ 228.25. [Reserved].**Source**

The provisions of this § 228.25 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial pages (204012) to (204013).

§ 228.25a. Amendment of license at the request of the licensee.

A licensee filing an application for an amendment shall utilize the procedures in § 228.21a (relating to notification and license requirements). The application shall specify the requested amendment and the reason for the amendment.

Source

The provisions of this § 228.25a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.26. [Reserved].**Source**

The provisions of this § 228.26 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204013).

§ 228.26a. Department action on applications to renew and amend.

In considering an application by a licensee to renew or amend a license, the Department will apply criteria in the act and this article.

Source

The provisions of this § 228.26a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

GENERAL RADIATION SAFETY REQUIREMENTS**§ 228.31. [Reserved].****Source**

The provisions of this § 228.31 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204013).

§ 228.31a. Limitations.

(a) The facility shall operate within the terms and conditions of the license issued for the operation of the accelerator.

(b) A licensee may not permit an individual to act as an operator of an accelerator until the individual:

- (1) Has been instructed in radiation safety and has demonstrated an understanding thereof.

(2) Has received copies of and instruction in this chapter and Chapters 219 and 220 (relating to standards for protection against radiation; and notices, instructions and reports to workers; inspections and investigations), pertinent registration and license conditions and the licensee's operating and emergency procedures and demonstrated understanding thereof.

(3) Has demonstrated competence to use the accelerator, related equipment and survey instruments which will be utilized in that individual's assignment.

(c) The radiation safety officer shall have the authority to restrict or terminate operations at an accelerator facility if the action is necessary to minimize danger to health and safety, property or the environment.

Source

The provisions of this § 228.31a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.32. [Reserved].

Source

The provisions of this § 228.32 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204013).

§ 228.32a. Shielding and safety design requirements.

(a) The licensee shall consult a qualified expert for the shielding design of accelerator installation and shall have the expert perform a radiation safety survey prior to the first use of the accelerator and when changes are made in shielding operations, equipment or occupancy of adjacent areas.

(b) An accelerator facility shall have primary and secondary protective barriers that are necessary to assure compliance with § 219.51 (Reserved).

Source

The provisions of this § 228.32a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.39 (relating to records).

§ 228.33. [Reserved].

Source

The provisions of this § 228.33 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204013).

§ 228.33a. Facility and shielding requirements.

In addition to the requirements in Chapter 219 (relating to standards for protection against radiation), the following are required:

- (1) The control panel shall be located outside the treatment or irradiation room.
- (2) For accelerators not used in the healing arts, provision shall be made to permit continuous observation of the material being irradiated and any transfer or conveyance of material within the irradiation room.
- (3) For accelerators used in the healing arts, provision shall be made to permit continuous observation of and communication with the patient during irradiation.
- (4) Windows, mirror systems or closed-circuit television viewing screens used for observing the patient or the material being irradiated shall be located so that the operator can maintain direct surveillance over both the control panel and the patient or the material being irradiated.
- (5) If the surveillance conducted under paragraph (4) is provided solely by electronic means, and if a malfunction of this surveillance equipment occurs, irradiation activities shall cease until repair of that surveillance equipment is performed and the equipment is found to be functioning normally.
- (6) Irradiation or treatment room entrances shall be provided with warning lights in a readily observable position near the outside of access doors. These will indicate when the useful beam is on.
- (7) Interlocks shall be provided so that entrance or access doors are closed before irradiation or treatment can be initiated or continued.
- (8) For accelerators used to irradiate materials by means of a transfer or conveyance system, a means shall be provided which either terminates the irradiation or prevents entry if an individual attempts access to the irradiation room.

Source

The provisions of this § 228.33a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.34. [Reserved].**Source**

The provisions of this § 228.34 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5085; reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204014).

§ 228.34a. Accelerator controls and interlock systems.

- (a) Instrumentation, readouts and controls on the accelerator control console shall be clearly identified and easily discernible.

(b) Entrances into a target room or high radiation areas shall have interlocks that meet the requirements of §§ 219.91 and 219.154 (Reserved). If the radiation beam is interrupted by a door opening, it shall be possible to reinitiate the radiation exposure only by closing the door first and then by manual action at the control panel.

(c) When an interlock system has been tripped, it shall only be possible to resume operation of the accelerator by manually resetting controls at the interlock position, and lastly at the main control console.

(d) Safety interlocks shall be fail-safe, that is, designed so that a defect or component failure in the interlock system prevents operation of the accelerator.

(e) A scram button or other emergency power cutoff switch shall be located and easily identifiable in all high radiation areas. The cutoff switch shall include a manual reset so that the accelerator cannot be restarted from the accelerator control console without resetting the cutoff switch.

Source

The provisions of this § 228.34a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.35. Operating procedures.

(a) Accelerators, when not in operation, shall be secured to prevent unauthorized use.

(b) An interlock may not be used to turn off the accelerator beam except in an emergency or for testing the interlock.

(c) Each safety and warning device, including interlocks, shall be checked at least every 3 months for proper functioning and shall be repaired as necessary. Results of these checks and records of repairs shall be maintained for 4 years at the accelerator facility for inspection by the Department.

(d) In the event of a malfunction of a safety or warning device, the accelerator may not be operated unless appropriate interim precautions are instituted to provide equivalent protection.

(e) If it is necessary to intentionally bypass a safety interlock system or component thereof, the action shall be the following:

(1) Authorized in writing by the radiation safety officer.

(2) Recorded in a permanent log and a notice posted at the accelerator operator's position.

(3) Terminated as soon as possible.

(f) A copy of the current operating and emergency procedures shall be maintained in the accelerator operator area.

(g) For accelerators used in the healing arts, operating procedures shall meet the following requirements:

(1) No individual other than the patient is in the treatment room during treatment of a patient.

(2) If a patient must be held in position during treatment, mechanical supporting or restraining devices shall be used.

(3) The system may not be used in the administration of radiation therapy unless the requirements of this chapter have been met.

(4) Misadministrations, as defined in § 215.2 (relating to definitions), shall be reported as required under § 219.228 (relating to reports of medical reportable events for radiation-producing machine therapy misadministrations).

(5) Only auxiliary personnel who have met the applicable radiologic requirements of 49 Pa. Code Part I, Subpart A (relating to occupational affairs) when employed by a licensed practitioner of the healing arts at the location at which the licensed practitioner practices shall be permitted to operate accelerators for therapeutic purposes.

(6) Only auxiliary personnel employed by a health care facility regulated by the Department of Health, the Department of Public Welfare or the Federal government shall be permitted to operate accelerator systems for therapeutic purposes in accordance with written job descriptions and employee qualifications.

(7) An individual who operates an accelerator system shall be instructed adequately in the safe operating procedures and be competent in the safe use of the equipment. The instructions shall include, but not be limited to, items included in Appendix A (relating to determination of competence).

Source

The provisions of this § 228.35 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.39 (relating to records).

§ 228.36. Radiation monitoring requirements.

An independent radiation monitoring system shall be provided so that the individuals entering or present in a potential very high radiation area become aware of the existence of the hazard. Independent radiation monitors shall be tested for response at least annually and after each servicing or repair.

Source

The provisions of this § 228.36 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894; amended November 16, 2001, effective November 17, 2001, 31 Pa.B. 6282. Immediately preceding text appears at serial pages (282440) to (282441).

Cross References

This section cited in 25 Pa. Code § 228.39 (relating to records).

§ 228.37. Production of radioactive material.

(a) A licensee who produces radioactive material incidental to the operation of an accelerator shall comply with the general license requirements of § 217.48 (Reserved).

(b) A licensee possessing radioactive material intentionally produced by bombarding nonradioactive material with the accelerator beam shall comply with the specific license requirements of §§ 217.51—217.57 (Reserved).

Source

The provisions of this § 228.37 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.38. Radiation safety surveys.

(a) A facility shall have an initial survey made by, or under the direction of, a qualified expert. A survey shall also be done after a change in the facility or equipment, including a relocation of the equipment within the irradiation or treatment room.

(b) The qualified expert shall report the survey results in writing to the individual in charge of the facility and a copy of the initial report shall be maintained by the licensee for inspection by the Department for the life of the facility. Other survey reports shall be maintained for inspection by the Department for 4 years. The facility shall be operated in compliance with limitations indicated by the survey.

(c) The report of the survey results shall include:

- (1) The date of the measurements.
- (2) The reason the survey is required.
- (3) The manufacturer's name, model number and serial number of the therapeutic radiation machine accelerator.
- (4) The instrument used to measure radiation levels.
- (5) A plan of the areas surrounding the treatment room that were surveyed.
- (6) The measured dose rate at several points in each area expressed in microsieverts or millirems per hour.
- (7) The calculated maximum level of radiation over a period of 1 year for each restricted and unrestricted area.
- (8) The signature of the individual who conducted or is responsible for conducting the survey.

(d) If the survey required by subsection (a) indicates that an individual in an unrestricted area may be exposed to levels of radiation greater than those permitted by § 219.31 or § 219.51 (Reserved), the licensee shall do the following:

- (1) Either equip the unit with beam direction interlocks or add additional radiation shielding to ensure compliance with Chapter 219 (relating to standards for protection against radiation).
- (2) Perform the survey required by subsection (a) again.
- (3) Prepare and submit the report required by subsection (a). The report shall also include:
 - (i) The results of the initial survey.
 - (ii) A description of the modification made to comply with this section.
 - (iii) The results of the second survey.

Source

The provisions of this § 228.38 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.39 (relating to records).

§ 228.39. Records.

In addition to the requirements of §§ 219.201—219.211 (Reserved), the licensee shall maintain:

- (1) Records of the tests and safety and warning devices described in § 228.35 (relating to operating procedures).
- (2) The surveys described in §§ 228.32a and 228.38 (relating to shielding and safety design requirements; and radiation safety survey).
- (3) The radiation monitoring equipment calibrations and repairs of that equipment under § 228.36 (relating to radiation monitoring requirements).

Source

The provisions of this § 228.39 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

**RADIATION SAFETY REQUIREMENTS FOR INDUSTRIAL
AND RESEARCH ACCELERATORS**

§ 228.41. [Reserved].

Source

The provisions of this § 228.41 reserved October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894. Immediately preceding text appears at serial page (204014).

§ 228.41a. Warning devices.

(a) A location designated as a high radiation area and an entrance to the location shall be equipped with easily observable warning lights that operate only when radiation is being produced.

(b) A high radiation area shall meet the requirements of § 219.91 (Reserved).

Source

The provisions of this § 228.41a adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.42. Circuit diagrams.

Electrical circuit diagrams of the accelerator and the associated safety, warning and interlock systems shall be kept current and maintained for inspection by the Department and shall be available to the operator at an accelerator facility.

Source

The provisions of this § 228.42 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.43. Radiation surveys.

(a) Periodic surveys shall be made to determine the amount of airborne radioactivity present in areas of airborne hazards.

(b) Periodic smear surveys shall be made to determine the amount of contamination in target and other pertinent areas.

(c) Area surveys shall be made in accordance with the written procedures established by a qualified expert or the radiation safety officer of the accelerator facility.

(d) Records of surveys shall be kept current and on file at an accelerator facility. Records of surveys shall be maintained as described in Chapter 219, Subchapter L (Reserved).

Source

The provisions of this § 228.43 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.44. Ventilation systems.

(a) A licensee shall control the concentration of radioactive material in air to meet the requirements of § 219.34 (Reserved).

(b) A licensee may not vent, release or otherwise discharge airborne radioactive material to an unrestricted area which does not meet the requirements of § 219.51 (Reserved). Every reasonable effort shall be made to maintain releases

of radioactive material to uncontrolled areas as far below these limits as practicable. Compliance with this section shall be demonstrated as described in § 219.52 (Reserved).

Source

The provisions of this § 228.44 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.45. Portable or mobile accelerators.

Portable or mobile accelerators used for industrial radiography or research shall comply with Chapter 225 (relating to radiation safety requirements for industrial radiographic operations).

Source

The provisions of this § 228.45 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

**RADIATION SAFETY REQUIREMENTS FOR
ACCELERATORS USED IN THE HEALING ARTS**

§ 228.61. Leakage radiation to the patient area.

(a) New equipment shall meet the following requirements:

(1) For operating conditions producing maximum leakage radiation, the dose due to leakage radiation, including X-rays, electrons and neutrons, at any point on a circle of 2 meters radius centered on and perpendicular to the central axis of the beam at the isocenter or normal treatment distance and outside the maximum useful beam size, may not exceed 0.1% of the maximum dose of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the plane surface. Measurements, excluding those for neutrons, shall be averaged over an area up to, but not exceeding, 100 square centimeters at the position specified. Measurements of the portion of the leakage radiation dose contributed by neutrons shall be averaged over an area up to, but not exceeding, 200 square centimeters.

(2) For each system, the licensee shall determine or obtain from the manufacturer the leakage radiation existing at the positions specified in paragraph

(1) for the specified operating conditions. The registrant or licensee shall maintain records for 5 years on leakage radiation measurements for inspection by the Department.

(b) Existing equipment shall meet the following requirements:

(1) For operating conditions producing maximum leakage radiation, the absorbed dose due to leakage radiation, including neutrons, at any point on a circle of 2 meters radius centered on and perpendicular to the central axis of the beam 1 meter from the virtual source, may not exceed 0.1% of the maximum absorbed dose of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the surface of the circular plane. Measurements shall be averaged over an area up to but not exceeding 100 square centimeters at the positions specified.

(2) For each system, the licensee shall have available the leakage radiation data existing at the positions specified in paragraph (1) for the specified operating conditions. The licensee shall maintain records on radiation leakage for 5 years for inspection by the Department.

Source

The provisions of this § 228.61 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.62 (relating to leakage radiation outside the patient area for new equipment).

§ 228.62. Leakage radiation outside the patient area for new equipment.

(a) The absorbed dose due to leakage radiation except in the area specified in § 228.61(a)(1) (relating to leakage radiation to the patient area) when measured at any point 1 meter from the path of the charged particles, before the charged particles strike the target or window, may not exceed 0.1% for X-ray leakage nor 0.5% for neutron leakage of the maximum absorbed dose of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the circular plane specified in § 228.61(a)(1).

(b) The licensee shall determine or obtain from the manufacturer, the actual leakage radiation existing at the positions specified in subsection (a) for specified operating conditions. Radiation measurements, including neutrons, shall be averaged over an area up to but not exceeding 200 square centimeters.

Source

The provisions of this § 228.62 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.63. Beam limiting devices.

Adjustable or interchangeable beam limiting devices shall be provided and the devices may transmit no more than 5% of the useful beam at the normal treatment distance. The neutron component of the useful beam may not be included to comply with this requirement.

Source

The provisions of this § 228.63 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.64. Filters.

(a) A filter which is removable from the system shall be clearly identified. Documentation shall contain a description of the filter which includes a drawing showing dimensions and noting materials of construction.

(b) For new equipment which utilizes a system of wedge filters, interchangeable field flattening filters or interchangeable beam scattering filters the following apply:

- (1) Irradiation may not be possible until a selection of a filter has been made at the control panel.
- (2) An interlock system shall be provided to prevent irradiation if the filter selected is not in the correct position.
- (3) An interlock shall be provided to prevent irradiation if a filter selection operation carried out in the treatment room does not agree with the filter selection operation carried out at the control panel.

Source

The provisions of this § 228.64 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.65. Electron beam quality.

The licensee shall determine that the following beam quality requirements are met:

- (1) The absorbed dose resulting from X-rays in a useful electron beam at a point on the central axis of the beam 10 centimeters greater than the practical range of the electrons may not exceed the values in Table I. Linear interpolation shall be used for values not stated.

Table I

<i>Maximum Energy of Electron Beam in MeV</i>	<i>X-Ray Absorbed Dose as a Fraction of Maximum Absorbed Dose</i>
1	0.03

<i>Maximum Energy of Electron Beam in MeV</i>	<i>X-Ray Absorbed Dose as a Fraction of Maximum Absorbed Dose</i>
15	0.05
35	0.10
50	0.20

(2) Compliance with paragraph (1) shall be determined using:

(i) A measurement within a phantom with the incident surface of the phantom at the normal treatment distance and normal to the central axis of the beam.

(ii) The largest field size available which does not exceed 15 centimeters by 15 centimeters.

(iii) A phantom whose cross-sectional dimensions exceed the measurement radiation field by at least 5 centimeters and whose depth is sufficient to perform the required measurement.

(3) The licensee shall determine, or obtain from the manufacturer, the maximum percentage absorbed dose due to stray neutrons in the useful beam for specified operating conditions.

Source

The provisions of this § 228.65 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.66. Beam monitors.

(a) Therapy systems shall be provided with radiation detectors in the radiation head.

(b) New equipment shall be provided with at least two radiation detectors incorporated into two separate dose monitoring systems.

(c) Existing equipment shall be provided with at least one radiation detector incorporated into a primary dose monitoring system.

(d) The detector in a dose monitoring system shall be:

(1) Permanently installed and interlocked to prevent incorrect positioning.

(2) Part of a dose monitoring system that provides readings in dose monitor units which can be used to calculate the absorbed dose at a reference point in the treatment volume.

(3) Capable of independently monitoring and controlling the useful beam.

(e) For new equipment, the design of dose monitoring systems shall assure that:

(1) The malfunctioning of one system does not affect the correct functioning of the second system.

(2) The failure of an element common to both systems which could affect the correct function of both systems terminates irradiation.

(f) A dose monitoring system shall have a legible display at the control panel. For new equipment, a display shall:

- (1) Maintain a reading until intentionally reset to zero.
- (2) Have only one scale and no scale multiplying factors.
- (3) Utilize a design so that increasing dose is displayed by increasing numbers and that the absorbed dose may be accurately determined under all conditions of use.
- (4) Provide that, in the event of a power failure, the dose monitoring information required in this subsection displayed at the control panel at the time of failure shall be retrievable.

Source

The provisions of this § 228.66 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.74 (relating to absorbed dose rate).

§ 228.67. Beam symmetry.

(a) In new equipment inherently capable of producing useful beams with asymmetry exceeding 5%, at least four different parts of the radiation beam shall be monitored before the beam passes through the beam limiting device.

(b) If the difference in dose rates between two of the different parts required in subsection (a) exceeds 10%, the irradiation shall be terminated.

Source

The provisions of this § 228.67 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.68. Selection and display of dose monitor units.

(a) Irradiation may not be possible until a selection of a number of dose monitor units has been made at the control panel.

(b) The preselected number of dose monitor units shall be displayed at the control panel until reset manually to zero before subsequent treatment can be initiated.

Source

The provisions of this § 228.68 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.69. Termination of irradiation by the dose monitoring system or systems.

(a) A dose monitoring system shall be capable of independently terminating irradiation.

(b) A primary system shall terminate irradiation when the preselected number of dose monitor units has been detected by the system.

(c) A secondary dose monitoring system shall terminate irradiation when either 110% of the preselected number of dose monitor units or 10 dose monitor units (whichever is greater) has been detected by the secondary dose monitoring system.

(d) For new equipment, an indicator on the control panel shall show which dose monitoring system has terminated irradiation.

Source

The provisions of this § 228.69 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.70. Interruption and termination switches.

The operator shall be able to interrupt or terminate irradiation and equipment movement at any time from the control panel. Following an interruption, the operator shall be able to resume irradiation without reselection of operating conditions.

Source

The provisions of this § 228.70 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.73 (relating to selection of stationary beam therapy or moving beam therapy).

§ 228.71. Timer.

(a) The control panel shall have a timer that is graduated in minutes and fractions of minutes or seconds. The timer shall have a preset time selector and an elapsed time indicator.

(b) The timer shall be cumulative and activated only during irradiation and shall retain its reading after irradiation is interrupted or terminated.

(c) The timer shall terminate irradiation when a preselected time has elapsed if the dose monitoring systems fail to do so.

Source

The provisions of this § 228.71 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.72. Selection of radiation type.

Equipment capable of both X-ray therapy and electron therapy shall meet the following additional requirements:

- (1) Irradiation may not be possible until a selection of radiation type and appropriate energy has been made and displayed at the control panel.
- (2) An interlock system shall be provided to insure that the equipment can emit only the radiation type which has been selected.
- (3) An interlock system shall be provided to prevent irradiation if selected operations carried out in the treatment room do not agree with the selected operations carried out at the control panel.
- (4) An interlock system shall be provided to prevent:
 - (i) Irradiation with X-rays except to obtain a port film when electron applicators are fitted.
 - (ii) Irradiation with electrons when accessories specific for X-ray therapy are fitted.
- (5) For new equipment, a system shall be provided to terminate irradiation if the energy of the electrons striking either the X-ray target or electron window deviates by more than +20% or 3 MeV, whichever is smaller, from the selected nominal energy.

Source

The provisions of this § 228.72 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.73. Selection of stationary beam therapy or moving beam therapy.

Equipment capable of both stationary beam therapy and moving beam therapy shall meet the following additional requirements:

- (1) Irradiation may not be possible until a selection of stationary beam therapy or moving beam therapy has been made at the control panel.
- (2) An interlock system shall be provided to insure that the equipment can operate only in the mode which has been selected.
- (3) An interlock system shall be provided to prevent irradiation if any selected operations carried out in the treatment rooms do not agree with the selected operations carried out at the control panel.
- (4) The mode of operation shall be displayed at the control panel.
- (5) An interlock system shall be provided to terminate irradiation if one of the following occurs:
 - (i) Movement of the gantry during stationary beam therapy.
 - (ii) Movement of the gantry stops during moving beam therapy unless the stoppage is a preplanned function.
- (6) An interlock system shall be provided to terminate irradiation if the number of dose monitor units delivered along an arc differs by more than 10%

from the selected value. Termination of irradiation shall be as required by § 228.70 (relating to interruption and termination switches).

Source

The provisions of this § 228.73 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.74. Absorbed dose rate.

New equipment shall have a system that provides information from which the absorbed dose rate at a reference point in the treatment volume can be calculated. The radiation detectors specified in § 228.66 (relating to beam monitors) may form part of this system. The dose monitor unit rate shall be displayed at the control panel.

Source

The provisions of this § 228.74 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

§ 228.75. Calibrations.

(a) The calibration of systems subject to this subchapter shall be performed in accordance with an established calibration protocol. The calibration protocol published by the American Association of Physicists in Medicine is accepted as an established protocol. Other protocols which are equivalent will be accepted, but the user shall submit that protocol to the Department for concurrence that the protocol is equivalent. The calibration shall be performed as follows:

(1) Before the system is first used for irradiation of a patient and, at time intervals which do not exceed 1 year.

(2) After a change which alters the calibration, spatial distribution or other characteristics of the therapy beam.

(b) The calibration shall be performed by, or under the direct supervision of, a qualified expert.

(c) Calibration radiation measurements required by subsection (a) shall be performed using a dosimetry system meeting the following specifications:

(1) The system has an exposure calibration factor appropriate to the beam energy measured and traceable to a National standard.

(2) The system has been calibrated within the previous 2 years and after servicing that may have affected its calibration.

(3) The system has been calibrated so that an uncertainty can be stated for the radiation quantities monitored by the system.

(4) The system has had constancy checks performed on the system as specified by a qualified expert.

(d) Calibrations made under this section shall be made so that the dose at a reference point in soft tissue may be calculated as accurately as possible but with an uncertainty of no greater than 5%.

(e) The calibration of the therapy beam shall include, but is not limited to, the following determinations:

(1) Verification that the equipment is operating in compliance with the design specifications concerning the light localizer, the side light and back-pointer alignment with the isocenter when applicable, variation in the axis of rotation for the table, gantry and beam limiting device (collimator) system.

(2) The absorbed dose rate at various depths (depth dose) and beam profile measured in water and the beam flatness and symmetry for the range of field sizes used, for each beam energy.

(3) The uniformity of the radiation field and a dependency upon the direction of the useful beam.

(4) Verification of depth-dose data and isodose curves applicable to the specific machine.

(5) Verification of the applicability of transmission factors of accessories such as wedges, shadow trays, compensators and their effects on electron buildup.

(6) The dose per monitor unit, end effect, linearity and dose rate dependence of the dose monitor systems.

(7) For photon beams, the congruence of the light field and the radiation field.

(8) For electron beams, the validity of commissioning data for virtual source distances or effective source-to-skin distances is to be verified at a single electron energy with a beam restriction device. When the replacement of a beam restriction device occurs, the determination will be required for each electron energy.

(f) Records of calibration measurements under subsection (a) and dosimetry system calibrations under subsection (c) shall be preserved for 5 years.

(g) A copy of the latest calibration performed under subsection (a) shall be available at the facility.

Source

The provisions of this § 228.75 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This section cited in 25 Pa. Code § 228.76 (relating to spot checks).

§ 228.76. Spot checks.

Spot checks shall be performed on systems subject to this subchapter during full calibrations and thereafter once in each calendar month. The spot checks shall meet the following requirements:

(1) The procedures shall be in writing and shall have been developed by a qualified expert.

(2) If a qualified expert does not perform the spot check measurements, the results of the spot check measurements shall be reviewed by a qualified expert within 15 days of the completion of the spot check.

(3) The measurements taken during spot checks shall demonstrate the degree of consistency of the operating characteristics which can affect the radiation output of the system or the radiation delivered to a patient during a therapy procedure.

(4) The spot-check procedures shall specify the acceptable tolerance for each parameter measured in the spot check when compared to the value for that parameter determined in the full calibration.

(5) If a spot check indicates a change in the operating characteristics of a system, as specified in the qualified expert's spot-check procedures, the system shall be recalibrated as required in § 228.75 (relating to calibrations).

(6) Records of spot-check measurements performed under this section shall be maintained by the licensee for 5 years after completion of the spot-check measurements and necessary corrective actions.

(7) Spot check measurements shall be performed using a dosimetry system that has been calibrated in accordance with § 228.75(c). Alternatively, a dosimetry system used solely for spot check measurements may be calibrated by direct intercomparison with a system that has been calibrated in accordance with § 228.75(c). This alternative calibration method shall have been performed within the previous year and after a servicing that may have affected the system calibration.

Source

The provisions of this § 228.76 adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

APPENDIX A DETERMINATION OF COMPETENCE

The following are areas in which an individual shall have expertise for the competent operation of radiation therapy equipment, the administration of radiation therapy treatment and determination of treatment portals:

- (1) *Familiarization with equipment.*
 - (i) Identification of controls.
 - (ii) Function of each control.
- (2) *Radiation protection.*
 - (i) Personnel protection.
 - (ii) Use of shielding blocks.
 - (iii) Understanding of dose units.
 - (iv) Grids.

- (3) *Film processing.*
 - (i) Ability to produce quality films for use by a physician.
 - (ii) Knowledge of portal film exposure factors.
 - (iii) Film processing parameters.
- (4) *Procedures.*
 - (i) Knowledge of anatomy and physiology.
 - (ii) Knowledge of patient immobilization devices to allow treatment with minimal patient movement.
 - (iii) Ability to position patient to allow for treatment of desired area.
- (5) *Emergency procedures.*
 - (i) Termination of treatment in event of machine primary and secondary and dose monitoring system failure.
 - (ii) Termination of treatment in the event of patient movement during treatment.
- (6) *Continuing education.* Continuing education annually to include radiation protection.

Source

The provisions of this Appendix A adopted October 2, 1998, effective October 3, 1998, 28 Pa.B. 4894.

Cross References

This appendix cited in 25 Pa. Code § 228.35 (relating to operating procedures).

[Next page is 229-1.]

**CHAPTER 230. PACKAGING AND TRANSPORTATION OF
RADIOACTIVE MATERIAL**

Subch.		Sec.
A.	SCOPE AND DEFINITIONS	230.1
B.	GENERAL	230.11
C.	[Reserved]	230.21
D.	OPERATING CONTROLS AND PROCEDURES	230.41
E.	[Reserved]	230.51

Authority

The provisions of this Chapter 230 issued under the Radiation Protection Act (35 P. S. §§ 7110.101—7110.703); the Low-Level Radioactive Waste Disposal Act (35 P. S. §§ 7130.101—7130.905); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20); amended under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 230 adopted November 17, 1995, effective November 18, 1995, 25 Pa.B. 5206, unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualifications); 25 Pa. Code § 217.1 (relating to purpose and scope); 25 Pa. Code § 217.144 (relating to incidental radioactive material produced by a particle accelerator); 25 Pa. Code § 224.1 (relating to purpose and scope); 25 Pa. Code § 225.1 (relating to purpose and scope); 25 Pa. Code § 226.1 (relating to purpose and scope); and 25 Pa. Code § 232.1 (relating to purpose and scope).

Subchapter A. SCOPE AND DEFINITIONS

Sec.	
230.1.	Purpose and scope.
230.2.	[Reserved].
230.3.	Incorporation by reference.
230.4.	Effect of incorporation of 10 CFR Part 71.
230.5.	Communications.

§ 230.1. Purpose and scope.

This chapter establishes requirements for packaging, preparation for shipment and transportation of radioactive material. This chapter applies to a person who transports radioactive material or delivers radioactive material to a carrier for transport.

§ 230.2. [Reserved].**Source**

The provisions of this § 230.2 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (204173) to (204176).

§ 230.3. Incorporation by reference.

(a) Except as provided in this chapter, the requirements of 10 CFR Part 71 (relating to packaging and transportation of radioactive material) are incorporated by reference.

(b) Notwithstanding the requirements incorporated by reference, 10 CFR 71.2, 71.6, 71.13(c) and (d), 71.24, 71.31, 71.33, 71.35, 71.37, 71.38, 71.39, 71.41, 71.43, 71.45, 71.47, 71.51, 71.52, 71.53, 71.55, 71.59, 71.63, 71.64, 71.65, 71.71, 71.73, 71.74, 71.75, 71.77, 71.83, 71.99 and 71.100 are not incorporated by reference.

Source

The provisions of this § 230.3 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 230.4. Effect of incorporation of 10 CFR Part 71.

To reconcile differences between this chapter and the incorporated sections of 10 CFR Part 71 (relating to packaging and transportation of radioactive material), the following words and phrases shall be substituted for the language in 10 CFR Part 71 as follows:

- (1) A reference to "NRC" or "Commission" means Department.
- (2) A reference to "NRC or agreement state" means Department, NRC or agreement state.
- (3) The definition of "sealed source" includes NARM.
- (4) The definition of "licensed material" includes NARM.
- (5) Notifications, reports and correspondence referenced in the incorporated parts of 10 CFR shall be directed to the Department and, for NRC licenses, to the NRC until agreement state status is in effect.

Source

The provisions of this § 230.4 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 230.5. Communications.

Notwithstanding the incorporation by reference of 10 CFR 71.1 (relating to communications and records), all communications concerning the requirements of this chapter should be sent to the address listed under § 215.41 (relating to address).

Source

The provisions of this § 230.5 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

Subchapter B. GENERAL**Sec.**

230.11 and 230.12. [Reserved].
230.13. Transportation of licensed material.
230.14. [Reserved].

§§ 230.11 and 230.12. [Reserved].**Source**

The provisions of these §§ 230.11 and 230.12 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (245185).

§ 230.13. Transportation of licensed material.

In addition to the incorporation by reference of 10 CFR Part 71 (relating to packaging and transportation of radioactive material), if 67 Pa. Code Chapters 229, 231 and 403 (relating to interstate motor carrier safety requirements; intrastate motor carrier requirements; and hazardous materials transportation) or the regulations of the United States Department of Transportation in 49 CFR Parts 171—180 and 388—397 do not apply to a shipment of licensed material, the licensee shall conform to the standards and requirements of those regulations to the same extent as if the shipment was subject to the regulations.

Source

The provisions of this § 230.13 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

§ 230.14. [Reserved].**Source**

The provisions of this § 230.14 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial page (243186).

Subchapter C. [Reserved]**§§ 230.21—230.26. [Reserved].****Source**

The provisions of these §§ 230.21—230.26 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (204179) to (204183).

Subchapter D. OPERATING CONTROLS AND PROCEDURES

Sec.
230.41—230.46. [Reserved].
230.47. Advance notification of transport of nuclear waste.

§§ 230.41—230.46. [Reserved].**Source**

The provisions of these §§ 230.41—230.46 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (204184) to (204188).

§ 230.47. Advance notification of transport of nuclear waste.

In addition to the incorporation by reference of 10 CFR Part 71 (relating to packaging and transportation of radioactive materials), the licensee is responsible for the following:

(1) Prior to the transport of nuclear waste specified in 10 CFR 71.97(b) (relating to advance notification of shipment of irradiated reactor fuel and nuclear waste) outside the licensee's facility or other place of use or storage, or prior to delivery to a carrier for transport, each licensee shall provide advance notification of the transport to the Governor, or the Governor's designee, of each state through which the waste will be transported, and to the Department.

(2) The notification required by paragraph (1) shall be made in writing to the office of each appropriate governor, or governor's designee, and to the Department. A notification delivered by mail shall be postmarked at least 7 days before the beginning of the 7-day period during which departure of the shipment is estimated to occur. A notification delivered by messenger shall reach the office of the governor, or governor's designee, and the Department, at least 4 days before the beginning of the 7-day period during which the departure of the shipment is estimated to occur. A copy of the notification shall be retained by the licensee for 3 years.

(3) The licensee shall notify each appropriate governor, or governor's designee, and the Department of changes to schedule information provided under paragraph (1). The notification shall be by telephone to a responsible individual in the office of each appropriate governor, or governor's designee, and the Department. The licensee shall maintain for 3 years a record of the individual contacted.

(4) Each licensee who cancels a nuclear waste shipment, for which advance notification has been sent, shall send a cancellation notice to each appropriate governor, or governor's designee, and to the Department. A copy of the notice shall be retained by the licensee for 3 years.

(5) A list of the mailing addresses of the governors and governors' designees is available upon request from the Director, Office of State Programs, United States Nuclear Regulatory Commission, Washington, DC 20555.

Source

The provisions of this § 230.47 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239.

Subchapter E. [Reserved]

§ 230.51. [Reserved].

Source

The provisions of this § 230.51 reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (204189) to (204190).

APPENDIX A. [Reserved]

Source

The provisions of this Appendix A reserved September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Immediately preceding text appears at serial pages (204191) to (204202).

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**CHAPTER 232. LICENSES AND RADIATION SAFETY
REQUIREMENTS FOR IRRADIATORS**

- Sec.
232.1. Purpose and scope.
232.2. Incorporation by reference.
232.3. Effect of incorporation of 10 CFR Part 36.

Authority

The provisions of this Chapter 232 issued under sections 301 and 302 of the Radiation Protection Act (35 P. S. §§ 7110.301 and 7110.302); and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20), unless otherwise noted.

Source

The provisions of this Chapter 232 adopted September 14, 2001, effective September 15, 2001, 31 Pa.B. 5239. Unless otherwise noted.

Cross References

This chapter cited in 25 Pa. Code § 215.32 (relating to exemption qualification); and 25 Pa. Code § 217.1 (relating to purpose and scope).

§ 232.1. Purpose and scope.

(a) This chapter contains the requirements for the issuance of a license authorizing the use of radioactive materials in sealed sources to irradiate objects or materials with gamma radiation.

(b) The requirements of this chapter are in addition to, and not in substitution for, other applicable requirements in this article, in particular, the requirements and provisions of Chapters 215, 217—220 and 230.

§ 232.2. Incorporation by reference.

(a) Except as provided in this chapter, the requirements of 10 CFR Part 36 (relating to licenses and radiation safety requirements for irradiators) are incorporated by reference.

(b) Notwithstanding the requirements incorporated by reference, §§ 36.5, 36.8, 36.91 and 36.93 are not incorporated by reference.

§ 232.3. Effect of incorporation of 10 CFR Part 36.

To reconcile differences between this chapter and the incorporated sections of 10 CFR Part 36 (relating to licenses and radiation safety requirements for irradiators), the following words and phrases shall be substituted for the language in 10 CFR Part 36 as follows:

- (1) A reference to “NRC” or “Commission” means Department.
- (2) A reference to “NRC or agreement state” means Department, NRC or Agreement State.
- (3) The definition of “sealed source” includes NARM.

(4) Notifications, reports and correspondence referenced in the incorporated parts of 10 CFR shall be directed to the Department and, for NRC licenses, to the NRC until agreement state status is in effect.

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