CHAPTER 33-10-04.2
STANDARDS FOR PROTECTION AGAINST RADIATION

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33-10-04.2-01. Adoption by reference of several sections in 10 Code of Federal Regulations part 20.

10 Code of Federal Regulations 20.1001, 20.1002, 20.1003, 20.1004, 20.1005, 20.1008, 20.1101, 20.1201, 20.1202, 20.1203, 20.1204, 20.1206, 20.1207, 20.1208, 20.1301, 20.1302, 20.1401, 20.1402, 20.1403, 20.1404, 20.1405, 20.1406, 20.1501, 20.1502, 20.1601, 20.1602, 20.1701, 20.1702, 20.1703, 20.1704, 20.1705, 20.1801, 20.1802, 20.1901, 20.1902, 20.1903, 20.1904, 20.1905, 20.1906, 20.2001, 20.2002, 20.2003, 20.2004, 20.2005, 20.2006, 20.2007, 20.2008, 20.2101, 20.2102, 20.2103, 20.2104, 20.2105, 20.2106, 20.2107, 20.2108, 20.2110, 20.2201, 20.2202, 20.2203, 20.2204, 20.2205, 20.2206, 20.2207, 20.2301, and 20.2302, appendix A through C to part 20, appendix E to part 20, and appendix G to part 20 are adopted by reference as they exist on October 1, 2015, with the following exceptions:

1. Not adopted by reference are 10 Code of Federal Regulations (CFR) 20.1406(b), 20.1905(g), 20.2203(c), and 20.2206(a)(1), (a)(3), (a)(4), and (a)(5).

2. All of the requirements in chapter 33-10-04.2 apply to both licensees and registrants. A reference in 10 CFR part 20 to "license" includes "registration", a reference to "licensee" includes "registrant", a reference to "licensed" includes "registered", a reference to "licensed material(s)" includes "registered source of radiation", and a reference to "licensed radioactive material" includes "registered source of radiation". "Registrant" means any person who is registered with the department and is legally obligated to register with the department pursuant to article 33-10 and North Dakota Century Code chapter 23-20.1. "Registration" means the notification of the North Dakota state department of health of possession of a source of radiation and the furnishing of information with respect thereto, in accordance with North Dakota Century Code chapter 23-20.

3. Where the words "NRC", "commission", "administrator of the appropriate NRC regional office", "administrator of the nearest commission regional office", or "NRC regional office" appear in 10 CFR part 20, substitute the words "North Dakota state department of health".

4. Requirements in 10 CFR part 20 that apply to "byproduct material" also apply to naturally occurring or accelerator-produced radioactive material.

5. "Act" includes North Dakota Century Code chapters 23-20 and 23-20.1.

6. North Dakota state form number 19443, "occupational radiation exposure history", must be used instead of NRC form 4 as specified in 10 CFR part 20.

7. North Dakota state form number 8416, "current occupational radiation exposure", must be used instead of NRC form 5 as specified in 10 CFR part 20.

8. NRC form 748 shall not be used as described in 10 CFR part 20.

9. The words "in the Federal Register and" shall be omitted from 10 CFR 20.1405(b).

History: Effective January 1, 2011; amended effective October 1, 2016.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-04.2-02. Individuals working with medical fluoroscopic equipment.

Each registrant shall provide dose monitoring and shall monitor occupational exposure to ensure compliance for:

1. Occupational dose limits to adults pursuant to 10 CFR 20.1201.

2. Occupational dose limits to minors pursuant to 10 CFR 20.1207.

3. The dose equivalent to an embryo/fetus pursuant to 10 CFR 20.1208.

History: Effective January 1, 2011.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-04.2-03. Location of individual monitoring devices.

Each licensee or registrant shall ensure that individuals who are required to monitor occupational doses in accordance with 10 CFR 20.1502 wear individual monitoring devices as follows:

1. An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck (collar);

2. An individual monitoring device used for monitoring the dose to an embryo or fetus of a declared pregnant woman, pursuant to 10 CFR 20.1208, shall be located at the waist under any protective apron being worn by the woman;

3. An individual monitoring device used for monitoring the lens dose equivalent, to demonstrate compliance with subparagraph a of 10 CFR 20.1201, shall be located at the neck (collar), outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye; and

4. An individual monitoring device used for monitoring the dose to the extremities, to demonstrate compliance with subparagraph a of 10 CFR 20.1201, shall be worn on the extremity likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.

History: Effective January 1, 2011; amended effective October 1, 2016.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-04.2-04. Effective dose equivalent determination during medical fluoroscopy.

When a protective apron is worn while working with medical fluoroscopic equipment and monitoring is conducted as specified in subdivision d, the effective dose equivalent for external radiation shall be determined as follows:

1. When only one individual monitoring device is used and it is located at the neck (collar) outside the protective apron, the reported deep dose equivalent shall be the effective dose equivalent for external radiation.

2. When only one individual monitoring device is used and it is located at the neck (collar) outside the protective apron, and the reported dose exceeds twenty-five percent of the limit specified in 10 CFR 20.1201, the reported deep dose equivalent value multiplied by three-tenths shall be the effective dose equivalent for external radiation.

3. When two individual monitoring devices are worn, one under the protective apron at the waist and the other outside the protective apron at the neck (collar), the effective dose equivalent for external radiation shall be assigned the value of the sum of the deep dose equivalent reported for the individual monitoring device located at the waist under the protective apron multiplied by one and five-tenths and the deep dose equivalent reported for the individual monitoring device located at the neck (collar) outside the protective apron multiplied by four-hundredths.

4. Subdivisions b and c only apply when all of the following conditions are met:

   a. The individual monitoring devices have not been exposed to radiation from radioactive material.

   b. Leaded glasses, a thyroid shield, and a wraparound protective apron have been worn whenever using the medical fluoroscopic equipment.

   c. The area around the medical fluoroscopic equipment has been equipped with lead shielding or transparent protective barriers for control of scattered radiation.

   d. The medical fluoroscopic procedures have been performed in a way that minimizes beam on time, such as utilizing last image hold.

   e. Users of the medical fluoroscopic equipment must have had formal training in radiation safety and operation of medical fluoroscopic equipment.

   f. Performance of the medical fluoroscopic equipment must be monitored and maintained via a quality assurance program.

   g. Patient and staff radiation exposures from medical fluoroscopic equipment must be monitored and actions taken to correct problems.

History: Effective January 1, 2011.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-04.2-05. Radiation machine security and prevention of unauthorized use.

1. The registrant shall secure registered radiation machines from unauthorized removal.

2. The registrant shall use devices or administrative procedures to prevent unauthorized use of registered radiation machines.

History: Effective January 1, 2011.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.01-04

33-10-04.2-06. Radiation machine labels.

Each registrant shall ensure that each radiation machine is labeled in a conspicuous manner which cautions individuals that radiation is produced when it is energized.

History: Effective January 1, 2011.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04

33-10-04.2-07. Additional requirements - Vacating premises.

Each specific licensee or registrant shall, no less than thirty days before vacating or relinquishing possession or control of premises which may have been contaminated with radioactive material as a result of the licensee's or registrant's activities, notify the department in writing of intent to vacate. When deemed necessary by the department, the licensee shall decontaminate the premises in accordance with the following or in such other manner as the department may specify.

1. **Premises.** Each licensee before vacating any premise, or transferring the premise, shall permanently decontaminate such premises to meet the criteria for decommissioning in 10 CFR part 20, subpart E as adopted by this chapter. A survey shall be made after such decontamination and the department and the landlord or subsequent tenant or transferee shall be provided with a copy of such survey no less than thirty days before vacating or relinquishing possession or control of premises. No such premise may be vacated, sold, or transferred until the decontamination survey has been verified and accepted by the department. For naturally occurring radioactive materials (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM), decontamination shall meet the standards found in table 4.2-07.1.

2. **Equipment.** No machinery, instruments, laboratory equipment, or any other property used in contact with, or close proximity to, NORM or TENORM, or both, at a licensed premise may be assigned, sold, leased, or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the standards specified in 10 CFR part 20, subpart E as adopted by this chapter. A survey shall be made after such decontamination and the department and subsequent transferee or owner shall be provided with a copy of such survey. No such equipment may be assigned, sold, leased, or transferred until such documentation survey has been verified and accepted by the department.

History: Effective January 1, 2015.
General Authority: NDCC 23-20.1-04
Law Implemented: NDCC 23-20.1-03, 23-20.1-04, 23-20.1-04.1

Table 4.2-07.1

Standards for Unrestricted Release for NORM and TENORM

(a) Surface contamination limits

(1) Alpha emitters

(i) Removable:	0.55Bq = 100cm^2	15.0 pCi = 100 cm^2	33 dpm 100 cm^2	average over any one surface
	1.665 Bq = 100 cm^2	45.0 pCi = 100 cm^2	100 dpm 100 cm^2	maximum
(ii) Total (fixed):	166.5 Bq = 100 cm^2	150.0 pCi = 100 cm^2	1,000 dpm 100 cm^2	average over any one surface
	832.5 Bq = 100 cm^2	2,250.0 pCi = 100 cm^2	5,000 dpm 100 cm^2	maximum
	2.5 μSv = hr	(0.25 mrem) = hr	maximum at 1 cm from surface	

(2) Beta-gamma emitters

(i) Removable:	3.7 Bq = 100 cm^2	100.0 pCi = 100 cm^2	average over any one surface	
	18.5 Bq = 100 cm^2	500.0 pCi = 100 cm^2	maximum	
(ii) Total (fixed)	2.5 μSv = hr	(0.25 mrem) = hr	maximum at 1 cm from surface	

(b) Concentration in air and water: Appendix B, Table 2 of chapter 33-10-04.2.

(c) Concentrations in soil and other materials except water:

(1) Radium in soil: Concentration of radionuclides above background concentrations for total radium, averaged over areas of one hundred square meters, shall not exceed:

(i) Five (5.0) picocurries per gram of soil, averaged over layers of fifteen centimeters thickness more than fifteen centimeters below the surface.

(ii) Five (5.0) picocurries per gram of dry soil, averaged over layers of fifteen centimeters thickness more than fifteen centimeters below the surface.

(2) Radium in other materials: Concentration of radionuclides above background concentrations for total radium shall not exceed five (5.0) picocuries per gram.

(d) The level of gamma radiation measured at a distance of hundred centimeters from the surface shall not exceed background.