

Minnesota Rules, Chapter 4732 X-ray Draft Revision

OCCUPATIONAL DOSE LIMITS FOR ADULTS, 1.0

Subpart 1. Applicability.

- A. A registrant must comply with the dose limits in this part.
- B. Occupational dose limits in this part includes student workers.

Subp. 2. Occupational dose limits for adults. A registrant must control the occupational dose to individual adults to:

- A. an annual limit, which is the more limiting of:
 - (1) the total effective dose equivalent being equal to 5 rem (0.05 Sv); or
 - (2) the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem (0.5 Sv).
- B. the annual limit to the lens of the eye, to the skin of the whole body, and to the extremities, which are:
 - (1) a lens dose equivalent of 15 rem (0.15 Sv); and
 - (2) a shallow-dose equivalent of 50 rem (0.5 Sv) to the skin or to any extremity.
- C. Planned special exposures are exempt from the requirement of this subpart.

Subp. 3. Dose in excess of annual limits. Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, must be subtracted from the limits for planned special exposures that an individual may receive during the current year and during the individual's lifetime.

Commented [TP(1)]: SSRCR D.1201
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Definition: "Total effective dose equivalent" (TEDE) means the sum of the deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

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Commented [TP(3)]: IL, WA, CO
In current Chapter 4732 and SSRCR

Commented [TP(4)]: Definition: "Planned Special Exposures" means an infrequent exposure to radiation, separate from and in addition to the annual dose limits.

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Subp. 4. **Dose equivalent.** The assigned deep dose equivalent and shallow dose equivalent must be for the portion of the body receiving the highest exposure.

Commented [TP(5)]: SSRCR D.1201, item C(i)

A. The deep-dose equivalent, lens dose equivalent, and shallow-dose equivalent may be assessed from a survey or other radiation measurements, for complying with the occupational dose limits if the individual monitoring device was not in the region of highest potential exposure or the results of the individual monitoring are unavailable; or

B. When a protective apron is worn while working with medical fluoroscopic x-ray systems and monitoring is conducted as specified in 4732.#### the effective dose equivalent for external radiation must be determined as follows:

Commented [TP(6)]: References draft rule, individual monitoring: Individual monitoring device, Subp. 2. Item A (5)

(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 must 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 25 percent of the limits specified in subpart 2, the reported deep dose equivalent value multiplied by 0.3 must be the effective dose equivalent for external radiation;

(3) when individual monitoring devices are worn, both under the protective apron at the waist and outside the protective apron at the neck, the effective dose equivalent for external radiation must 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 1.5 and the deep dose

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equivalent reported for the individual monitoring device located at the neck outside the protective apron multiplied by 0.04; or

(4) by determining the effective dose equivalent based on National Council on Radiation Protection and Measurements Report No. 122, "Use of Personal Monitors to Estimate Effective Dose Equivalent and Effective Dose to Workers for External Exposure to Low-Let Radiation" or other nationally recognized guidelines.

C. The registrant must include any documented occupational dose received by a worker while employed at another registrant when calculating an worker's total annual occupational dose.

Commented [TP(7): SSRCR D.1201, item f II, WA, CO

OCCUPATIONAL DOSE LIMITS FOR MINORS, 1.0

Subp. 5. Occupational dose limits for minors. The annual occupational dose limits for minors are 10 percent of the annual occupational dose limits specified for adult workers in subpart 2.

Commented [TP(8): SSRCR D.1207 II, WA, CO

DECLARED PREGNANCY DOSE LIMITS, 1.0

Subp. 6. Dose equivalent to an embryo/fetus. A registrant is required to comply with this part for a woman who declares her pregnancy in writing.

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A. A registrant must confirm that the dose equivalent to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv).

Commented [TP(10): Definition: "Declared Pregnant Woman" means a woman who has voluntarily informed the registrant, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

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- B. A registrant must avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman to satisfy the dose equivalent in item A.
- C. If the dose equivalent to the embryo/fetus exceeds 0.5 rem (5 mSv), or is within 0.05 rem (0.5 mSv) of this dose by the time the woman declares the pregnancy to the registrant, the registrant must be in compliance with item A if the additional dose to the embryo/fetus does not exceed 0.05 rem (0.5 mSv) during the remainder of the pregnancy.

PLANNED SPECIAL EXPOSURES, 1.0

Subp. 7. Planned special exposures. A registrant may authorize an adult worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in subpart 2, if each of the following conditions is met:

- A. the registrant authorizes a planned special exposure only in an exceptional situation when alternatives that might avoid the dose estimated to result from the planned special exposure are unavailable or impractical;
- B. the registrant and employer, if the employer is not the registrant, specifically authorize the planned special exposure, in writing, before the exposure occurs;
- C. before a planned special exposure, the registrant verifies that each individual involved is:
 - (1) informed of the purpose of the planned operation;
 - (2) informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task; and

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(3) instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present;

D. before permitting an individual to participate in a planned special exposure, the registrant determines prior doses as required by 4732.#### during the lifetime of the individual for each individual involved;

Commented [TP(12)]: References draft rule, individual monitoring: Individual monitoring records, subp. 9

E. subject to subpart 3, the registrant must not authorize a planned special exposure that would cause an individual to receive a dose from all planned special exposures and all doses in excess of the limits to exceed:

(1) the numerical values of any of the dose limits in subpart 2 in any year; and

(2) five times the annual dose limits in subpart 2 during the individual's lifetime;

F. the registrant maintains records of the conduct of a planned special exposure according to part 4732.#### and submits a written report according to part 4732.####; and

Commented [TP(13)]: References draft rule, individual monitoring: Individual monitoring records, subp. 9

Commented [TP(14)]: References draft rule, Notification of occupational exposures exceeded.

G. the registrant records the best estimate of the dose resulting from the planned special exposure in the individual's record and informs the individual, in writing, of the dose within 30 days from the date of the planned special exposure. The dose from planned special exposures must not be considered in controlling future occupational dose of the individual under subpart 2, but must be included in evaluations required under items D and E.

DOSE LIMITS FOR MEMBERS OF THE PUBLIC, 1.0

Subp. 8. Dose limits for individual members of the public.

Commented [TP(15)]: SSRCR D.1301 II, WA, CO

A. Each registrant must conduct operations so that:

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- (1) the total effective dose equivalent to individual members of the public from the registered operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contribution from background radiation, from any medical x-ray imaging, voluntary participation in medical research programs, or security screening the individual has received;
 - (2) the dose in any unrestricted area does not exceed 0.002 rem (0.02 mSv) in any one hour; and
 - (3) The total effective dose equivalent to individual members of the public from infrequent exposure to radiation from radiation x-ray systems does not exceed 0.5 rem (5 mSv).
- B. If the registrant permits members of the public to have access to restricted areas, the dose limits for members of the public continue to apply to those individuals.
- C. A registrant must comply with the annual dose limit in this subpart by measuring or calculating the total effective dose equivalent to the individual member of the public likely to receive the highest dose from the registered operation does not exceed the annual dose limit.

Commented [TP(16)]: SSRCR D.1302
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