

The Radiation Health and Safety Regulations

Repealed

by Chapter R-1.1 Reg 2 (effective March 10, 2005).

Formerly

Chapter R-1.1 Reg 1 (effective February 9, 1993).

NOTE:

This consolidation is not official. Amendments have been incorporated for convenience of reference and the original statutes and regulations should be consulted for all purposes of interpretation and application of the law. In order to preserve the integrity of the original statutes and regulations, errors that may have appeared are reproduced in this consolidation.

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CHAPTER R-1.1 REG 1
The Radiation Health and Safety Act, 1985

PART I
Title and Interpretation

Title

1 These regulations may be cited as *The Radiation Health and Safety Regulations*.

Interpretation

2(1) In these regulations:

- (a) “**absorbed dose**”, with respect to any medium, means the ionizing radiation energy absorbed per unit mass, expressed in grays;
- (b) “**Act**” means *The Radiation Health and Safety Act, 1985*;
- (c) “**approved**”, with respect to equipment, means that:
 - (i) the equipment meets:
 - (A) a relevant Canadian standard acceptable to an officer; or
 - (B) a standard that is prepared and publicly issued by the department; or
 - (ii) the equipment had been approved by an officer in writing on an individual basis;
- (d) “**cavity**” means a structure that encloses and confines a microwave field;
- (e) “**chief occupational medical officer**” means the chief occupational medical officer appointed pursuant to section 12 of *The Occupational Health and Safety Act*;
- (f) “**chiropractic clinic**” means a place in which radiation equipment is used by or under the direction of a chiropractor for diagnostic purposes with respect to a patient;
- (g) “**commercial tanning salon**” means a sun tanning parlour, health spa, fitness centre, sports or recreational centre, beauty salon or any other establishment:
 - (i) that is open to the public or to members of a club or association; and
 - (ii) in which a person’s skin is deliberately exposed to ultraviolet radiation;

but does not include any hospital or medical clinic where exposures to ultraviolet radiation are administered under medical supervision for therapeutic purposes;

(h) “**committed dose**” means the dose equivalent received by any organ or tissue of the body of a person from the intake of any radioactive substance, other than short-lived radon daughters or thoron daughters, during the period of 50 years immediately following the intake;

(i) “**dose equivalent**” means the product of absorbed dose and the appropriate radiation weighting factor set out in Table 1;

(j) “**effective dose equivalent**” means effective dose equivalent determined in accordance with sections 5 and 6;

(k) “**electromagnetic radiation**” means energy in the form of electromagnetic fields emitted from any source, and includes extremely low frequency radiation, radio frequency radiation, infrared radiation, visible light, ultraviolet radiation, x-rays and gamma rays;

(l) “**external source**” means any source of ionizing radiation other than radioisotopes that:

(i) have been ingested or inhaled by an occupational worker; and

(ii) are irradiating tissues from within the occupational worker’s body;

(m) “**extremely low frequency radiation**” means electromagnetic radiation in the frequency range below 10 kilohertz;

(n) “**irradiance**” means radiant power incident per unit area expressed in watts per square metre;

(o) “**laser**” means an optical source that emits coherent, monochromatic radiation from a solid state, gaseous or liquid lasing source;

(p) “**laser device**” means a device that incorporates a laser;

(q) “**laser light show**” means a form of entertainment that incorporates the use of any laser or laser device;

(r) “**laser scanner**” means a device that uses scanned laser radiation within the wavelength range of 400 to 1400 nanometres to decipher or generate codes represented by drawn or printed geometrical patterns;

(s) “**medical clinic**” means a place, other than a hospital or a chiropractic clinic, in which radiation equipment is used for diagnostic or therapeutic purposes with respect to a patient, and includes a medical laboratory within the meaning of *The Medical Laboratory Licensing Act*;

(t) “**medical ultrasound equipment**” means ultrasound equipment that is designed for use in a hospital, medical clinic or other place in carrying out diagnostic or therapeutic procedures on patients;

(u) “**microwave radiation**” means radio frequency radiation in the frequency range from 1.5 gigahertz to 300 gigahertz;

- (v) **“National Dose Registry”** means the centralized record-keeping system containing the dose information of radiation workers in Canada that is maintained by the Bureau of Radiation and Medical Devices of the Department of Health and Welfare of the Government of Canada;
- (w) **“patient”** means a person who is undergoing diagnosis or treatment by or under the direction of a health care professional;
- (x) **“radio frequency radiation”** means electromagnetic radiation in the frequency range from 10 kilohertz to 300 gigahertz;
- (y) **“Radiation Safety Unit”** means the Radiation Safety Unit of the department;
- (z) **“radon daughters”** means the following short-lived radioactive decay products of radon-222:
- (i) polonium-218 (radium A);
 - (ii) lead-214 (radium B);
 - (iii) bismuth-214 (radium C);
 - (iv) polonium-214 (radium C’);
- (aa) **“thoron daughters”** means the following short-lived radioactive decay products of radon-220:
- (i) polonium-216 (thorium A);
 - (ii) lead-212 (thorium B);
 - (iii) bismuth-212 (thorium C);
 - (iv) polonium-212 (thorium C’);
- (bb) **“ultrasound”** means longitudinal pressure waves with frequencies greater than 15 kilohertz;
- (cc) **“ultraviolet radiation”** means electromagnetic radiation in the wavelength range from 180 nanometres to 400 nanometres;
- (dd) **“working level”** means:
- (i) with respect to radon, the unit of exposure rate that results from radon daughters in air, and is equal to the concentration of any combination of those radon daughters in one litre of air that has the potential to ultimately result in the emission of 1.3×10^5 megaelectronvolts of alpha particulate radiation; and
 - (ii) with respect to thoron, the unit of exposure rate that results from thoron daughters in air, and is equal to the concentration of any combination of those thoron daughters in one litre of air that has the potential to ultimately result in the emission of 1.3×10^5 megaelectronvolts of alpha particulate radiation;

- (ee) **“working level month”** means the unit of exposure to radon daughters or thoron daughters that is equal to 1/170th of the summation of exposure times in hours multiplied by radon daughter or thoron daughter concentrations expressed in working levels;
 - (ff) **“year”** means any period of 12 consecutive months.
- (2) In these regulations:
- (a) references to tables are references to the tables set out in Part I of the Appendix;
 - (b) references to figures are references to the figures set out in Part II of the Appendix; and
 - (c) references to forms are references to the forms set out in Part III of the Appendix.

26 Feb 93 cR-1.1 Reg 1 s2.

PART II Ionizing Radiation

Maximum permissible dose for members of public

3 For the purposes of subclause 5(2)(b)(ii) of the Act, the maximum permissible dose for one year is 10 millisieverts.

26 Feb 93 cR-1.1 Reg 1 s3.

Dose limits

4(1) An owner of ionizing radiation equipment shall ensure that the effective dose equivalent of occupational workers exposed to ionizing radiation:

- (a) is as low as is reasonably achievable with economic and social factors taken into consideration;
 - (b) does not exceed an average of 20 millisieverts per year during any period of five consecutive years ending after July 1, 1997; and
 - (c) does not exceed 50 millisieverts in any one year.
- (2) Where the dose equivalent received by an occupational worker in one year from external sources of radiation exceeds 20 millisieverts, the owner of ionizing radiation equipment shall submit to the Radiation Safety Unit a written report explaining in full the circumstances in which the dose arose and summarizing the steps that will be taken to minimize the possibility of similar doses arising in the future.
- (3) For the purposes of clauses (1)(b) and (c), the first year commences on any day that is convenient for the purposes of dosimetry.

- (4) Where the pregnancy of an occupational worker is reported to an owner of ionizing radiation equipment, the owner shall make arrangements to ensure that the dose equivalent received by the pregnant occupational worker at the surface of the abdomen from all external sources during the remainder of the pregnancy does not exceed two millisieverts.
- (5) The dose equivalent mentioned in subsection (4) is deemed to be equal to the effective dose equivalent received by the occupational worker unless evidence to the contrary is produced.
- (6) In addition to the limits set out in subsections (1) and (4), an owner of ionizing radiation equipment shall ensure that the annual dose equivalents received by specified tissues of an occupational worker do not exceed:
- (a) 500 millisieverts averaged over any area of one square centimetre at a depth of 70 micrometres in the basal tissue of the skin; and
 - (b) 150 millisieverts to the lens of the eye.
- (7) In addition to the limits set out in subsections (1), (4) and (6), an owner of ionizing radiation equipment shall ensure that the annual exposure of an occupational worker to radon daughters does not exceed an absolute limit of 4 working level months.

26 Feb 93 cR-1.1 Reg 1 s4.

Effective dose equivalent

- 5(1) The effective dose equivalent of a person consists of:
- (a) the contributions received from all external sources of radiation, including:
 - (i) ionizing radiation installations; and
 - (ii) any radioactive substance associated with operations licensed pursuant to the *Atomic Energy Control Act* (Canada) that may be or may have been in use at the place or places of employment;
 - (b) the committed dose from all radioisotopes, other than radon daughters or thoron daughters, that are ingested or inhaled in the course of employment during the year; and
 - (c) the contribution arising from the inhalation of radon daughters and thoron daughters.
- (2) Where uniform whole body irradiation of an occupational worker from external sources occurs, the contribution to the worker's effective dose equivalent from the external sources is deemed to be the dose equivalent from those sources reported to the National Dose Registry.
- (3) Where non-uniform irradiation of an occupational worker from external sources occurs, the contribution to the worker's effective dose equivalent from the external sources is the sum of the weighted dose equivalents for each of the tissues that is irradiated.

- (4) For the purposes of subsection (3), the weighted dose equivalent for a tissue is calculated by:
- (a) determining the mean dose equivalent received by the tissue during the previous 12 months; and
 - (b) multiplying the mean dose equivalent by the weighting factor for the tissue that is set out in Table 2.
- (5) Where an occupational worker inhales or ingests radioisotopes other than radon daughters or thoron daughters, the committed dose to the worker that is associated with this intake is the dose equivalent from those sources reported to the National Dose Registry.
- (6) Where an occupational worker is exposed to radon daughters or thoron daughters, the contribution mentioned in clause (1)(c) is to be recorded annually in working level months.

26 Feb 93 cR-1.1 Reg 1 s5.

Calculation of effective dose equivalent

6 The effective dose equivalent received by an occupational worker:

- (a) during a year is calculated in accordance with the formula:

$$E = \left[\frac{D_E + D_I}{50} + \frac{D_R}{4.8} + \frac{D_T}{14} \right] \times 50 \text{ millisieverts}$$

and

- (b) during any period of five consecutive years is calculated in accordance with the formula:

$$E = \left[\frac{D_E + D_I}{100} + \frac{D_R}{24} + \frac{D_T}{70} \right] \times 100 \text{ millisieverts}$$

where:

E is the effective dose equivalent;

D_E is the total of the contributions to the effective dose equivalent in millisieverts from all external sources determined in accordance with subsections 5(2) and (3);

D_I is the committed dose in millisieverts from all inhaled or ingested radioisotopes other than radon daughters or thoron daughters determined in accordance with subsection 5(5);

D_R is the exposure to radon daughters measured in working level months;

D_T is the exposure to thoron daughters measured in working level months.

26 Feb 93 cR-1.1 Reg 1 s6.

Monitoring of dose

- 7(1) An owner of ionizing radiation equipment shall ensure that the dose received by an occupational worker is systematically determined by a procedure acceptable to an officer.
- (2) An owner of ionizing radiation equipment shall ensure that the dose of an occupational worker determined by monitoring pursuant to subsection (1) is reported to the National Dose Registry and to the Radiation Safety Unit not less than once every three months.
- (3) Subsection (2) does not apply to a dose of less than 0.25 millisieverts received by an occupational worker in a period of three months.
- (4) For the purpose of assessing compliance with the limits set by the Act and these regulations, the current reading entered into the National Dose Registry with respect to an occupational worker is deemed to be the actual dose received by the occupational worker.
- (5) Where, in the opinion of an officer, the circumstances warrant it, the officer may require an owner to investigate the exposure of an occupational worker to ionizing radiation and report the results of the investigation to the Radiation Safety Unit without delay.

26 Feb 93 cR-1.1 Reg 1 s7.

Additional monitoring procedures

- 8(1) Where an occupational worker is at risk of high exposure to ionizing radiation, an owner of ionizing radiation equipment shall carry out the monitoring procedures required by subsection (3) in addition to complying with subsection 7(1).
- (2) For the purposes of subsection (1), an occupational worker is deemed to be at risk of high exposure to ionizing radiation:
- (a) where an occupational worker carrying out similar duties at the same place of employment has on a previous occasion received an annual effective dose equivalent of 5 millisieverts or more, unless an officer issues a written exemption; or
 - (b) where an officer notifies the owner in writing that, in the officer's opinion, there is a significant possibility of an occupational worker's effective dose equivalent exceeding 7.5 millisieverts.
- (3) Where an occupational worker to whom subsections (1) and (2) apply is exposed to x-rays or gamma radiation, the owner:
- (a) shall:
 - (i) arrange for a thermoluminescence dosimeter to be issued by the Bureau of Radiation and Medical Devices of the Department of Health and Welfare of the Government of Canada for the exclusive use of the worker; or

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(ii) initiate a monitoring procedure that is acceptable to an officer and that satisfies the following conditions:

(A) the monitoring procedures proposed can be shown to achieve a degree of accuracy that is acceptable to the officer;

(B) provision is made for immediate notification of the Radiation Safety Unit whenever a monitoring result indicates that the worker may have received an effective dose equivalent in excess of 5 millisieverts; and

(C) provision is made for reporting all monitoring results to the National Dose Registry not less than once every three months; and

(b) where non-uniform irradiation of the worker occurs, shall:

(i) evaluate all significant contributions to the worker's dose equivalent pursuant to subsection 5(3); and

(ii) report the contributions mentioned in subclause (i) to the National Dose Registry not less than once every three months.

26 Feb 93 cR-1.1 Reg 1 s8.

Records of dose

9(1) An owner or operator who employs occupational workers or who is in charge of training being received by occupational workers shall maintain a separate cumulative record on a continuous permanent basis for each worker showing:

(a) the duration of exposure and the nature of the radiation to which the worker is exposed;

(b) all measurements pertaining to the dose received, both externally and internally, by the worker for the preceding 12 months; and

(c) the committed doses received from any radioactive substances deposited within the body of the worker that have been determined by any monitoring or sampling procedures followed at the place of employment or from any bio-assay procedures that have been carried out.

(2) An owner or operator mentioned in subsection (1) shall inform each worker of his or her dose at intervals not exceeding three months.

26 Feb 93 cR-1.1 Reg 1 s9.

Pregnancy of occupational worker

10(1) An occupational worker who knows or suspects that she is pregnant shall immediately report that fact or suspicion to the owner or operator of the ionizing radiation equipment or installation.

(2) An owner or operator who employs occupational workers or who is in charge of training being received by occupational workers shall advise those occupational workers of their duties pursuant to subsection (1).

(3) If an occupational worker who is pregnant desires to continue in employment or training, the owner or operator shall reassess and, if necessary, revise the employment duties or educational activities of the worker so that the limit set by subsection 4(3) is not exceeded.

26 Feb 93 cR-1.1 Reg 1 s10.

Mobile x-ray equipment

11(1) For the purposes of clause 4(2)(a) of the Act, an owner of mobile ionizing radiation equipment other than equipment that is:

- (a) used in medical, dental, chiropractic or other health care facilities for the purpose of making a diagnosis on a patient; or
- (b) used exclusively in a veterinary practice;

shall furnish the statement required by subsection 4(1) of the Act before the equipment is used in Saskatchewan.

(2) For the purposes of clause 4(2)(b) of the Act, an owner of mobile ionizing radiation equipment to which subsection (1) applies shall:

- (a) furnish the department with an itinerary for the equipment; and
- (b) from time to time, furnish the department with updates to the itinerary.

(3) For the purposes of clause 4(2)(a) of the Act, an owner of mobile ionizing radiation equipment that is:

- (a) used in medical, dental, chiropractic or other health care facilities for the purpose of making a diagnosis on a patient; or
- (b) used exclusively in a veterinary practice;

shall furnish the statement required by subsection 4(1) of the Act within one month of the day on which the equipment comes under the owner's control.

(4) An itinerary mentioned in this section is to contain the following particulars:

- (a) the days on which the equipment will be used;
- (b) the locations where the equipment will be used on the days of equipment use; and
- (c) a phone number through which the operator can be contacted on the days of equipment use.

26 Feb 93 cR-1.1 Reg 1 s11.

Change of use

12 No owner of ionizing radiation equipment shall cause or permit the equipment to be used for any function or purpose other than the function or purpose for which it is intended or was designed unless the owner first obtains the written approval of an officer.

26 Feb 93 cR-1.1 Reg 1 s12.

R-1.1 REG 1**RADIATION HEALTH AND SAFETY****Modifications to equipment**

13(1) No owner of ionizing radiation equipment shall cause or permit the modification or alteration of the equipment or the structural shielding of the equipment unless the modification or alteration is approved by:

- (a) the equipment manufacturer; or
- (b) an officer.

(2) An owner of ionizing radiation equipment shall give notice to the Radiation Safety Unit of any modification or alteration of the structural shielding, not later than 15 days after the modification or alteration is made.

26 Feb 93 cR-1.1 Reg 1 s13.

Safety and preventive maintenance inspections

14(1) An owner of ionizing radiation equipment and associated apparatus that is used in a hospital or medical clinic shall arrange for the inspection of that equipment and apparatus by a qualified person in a manner and to a degree that is satisfactory to an officer to ensure that the equipment and apparatus:

- (a) is in safe operating condition; and
- (b) has undergone a radiation calibration, the results of which are recorded on a form supplied by the department.

(2) For the purposes of subsection (1), a person who holds a valid and subsisting restricted journeyman's licence issued pursuant to *The Electrical Licensing Act* is a qualified person.

(3) An owner of ionizing radiation equipment that is a dental, chiropractic or veterinary x-ray unit shall arrange for the inspection of the equipment in accordance with subsection (1).

(4) A person who conducts an inspection pursuant to subsection (1) or (3) shall, within 30 days after completing the inspection, submit to the Radiation Safety Unit on the form mentioned in clause (1)(b) details of all tests carried out and all measurements made in the course of the inspection.

26 Feb 93 cR-1.1 Reg 1 s14.

Frequency of inspections

15(1) Subject to subsections (2) to (4), an inspection required by subsection 14(1) is to be carried out not less than once per year.

(2) Except in the case of mobile x-ray equipment, an inspection required by subsection 14(1) is to be carried out not less than twice per year where the equipment or associated apparatus:

- (a) is used to perform 5,000 to 10,000 diagnostic examinations per year;
- (b) is 15 to 19 years of age; or
- (c) is equipment or apparatus that has an image intensifier.

- (3) Except in the case of mobile x-ray equipment, an inspection required by subsection 14(1) is to be carried out not less than three times per year where the equipment or associated apparatus:
- (a) is used to perform more than 10,000 diagnostic examinations per year; or
 - (b) is 20 years old or older.
- (4) In the case of mobile x-ray equipment, an inspection required by subsection 14(1) is to be carried out not less than twice per year where the equipment:
- (a) is used in a hospital with a capacity greater than 200 beds; or
 - (b) is equipped with an image intensifier.
- (5) Subject to subsection (6), an inspection required by subsection 14(3) is to be carried out not less than:
- (a) once every three years for dental or chiropractic x-ray units; and
 - (b) once every five years for veterinary x-ray units.
- (6) No inspection is required pursuant to subsection 14(3) until five years have elapsed since the date of manufacture of the equipment.
- (7) No two consecutive inspections required by this section are to be carried out at intervals of less than 60 days without the approval of an officer.

26 Feb 93 cR-1.1 Reg 1 s15.

Certification of new equipment

- 16(1)** A vendor of ionizing radiation equipment or associated apparatus shall complete an inspection of the electrical and mechanical components of the equipment or apparatus:
- (a) after the equipment or apparatus is installed or otherwise placed in the premises of a prospective owner; and
 - (b) before the equipment or apparatus is transferred to the control of the prospective owner.
- (2) A vendor mentioned in subsection (1) shall notify the department of the inspection on a form supplied by the department certifying that the equipment or apparatus has been properly installed and can be safely used.

26 Feb 93 cR-1.1 Reg 1 s16.

Quality assurance

- 17(1)** An owner of ionizing radiation equipment that is used in a hospital, a medical clinic or a chiropractic clinic shall ensure that a code of practice for quality assurance procedures that meets the requirements of subsection (2) is prepared for use with that equipment.
- (2) A code of practice for quality assurance procedures is to:
- (a) be acceptable to an officer in form and content;

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- (b) clearly specify the quality assurance procedures that are to be followed by the operators and other occupational workers; and
 - (c) be appropriate to:
 - (i) the extent of use of ionizing radiation by the hospital or clinic; and
 - (ii) the level of expertise of the operators and other occupational workers.
- (3) An owner of ionizing radiation equipment that is used in a hospital, a medical clinic or a chiropractic clinic shall ensure that:
- (a) at the times specified by an officer, the operators of the equipment participate in the Radiation Safety Unit's postal quality assurance program by:
 - (i) conducting the tests that are required as part of the program; and
 - (ii) returning the exposed test package to the department promptly;
 - (b) the operators have ongoing access to the test phantom and step wedge used for carrying out the tests mentioned in subclause (a)(i); and
 - (c) for each x-ray unit, a quality assurance file is:
 - (i) established, containing full records of all quality assurance procedures carried out with the unit; and
 - (ii) maintained throughout the working life of the unit unless permission to destroy the file is granted in writing by an officer.

26 Feb 93 cR-1.1 Reg 1 s17.

X-ray fluoroscopy

18 An owner of ionizing radiation equipment used for x-ray fluoroscopy shall ensure that x-ray fluoroscopy is not used solely for positioning a patient for radiographic examination except where this has been authorized in writing for a specific patient by a radiologist prior to the examination.

26 Feb 93 cR-1.1 Reg 1 s18.

Display of radiation hazard sign

19 Where ionizing radiation equipment capable of producing dose rates greater than 25 microsieverts per hour in accessible areas is operated, the owner shall ensure that:

- (a) in the case of a room used solely for medical diagnosis of patients, a sign bearing the word "X-RAY" is prominently displayed on each door that gives access to the room;
- (b) in the case of any other room, a sign bearing the word "RADIATION" and the radiation hazard symbol shown in Figure 1 and described in section 20 or any other symbol approved by an officer is prominently displayed on each door that gives access to the room; and

- (c) in the case of an open area:
 - (i) a mobile barrier is erected to enclose the area in which a dose rate greater than 25 microsieverts per hour may be produced; and
 - (ii) signs bearing the radiation hazard symbols mentioned in clause (b) are placed on the barrier so that at least one sign is always clearly visible as the area is approached.

26 Feb 93 cR-1.1 Reg 1 s19.

Radiation hazard symbol

20(1) The radiation hazard symbol is to be:

- (a) as prominent as is practicable;
- (b) of a size that:
 - (i) is consistent with the size of the object to which it is affixed;
 - (ii) permits the symbol to be recognized from a safe distance; and
 - (iii) maintains the proportions illustrated in Figure 1.
- (2) Unless the circumstances do not permit, the radiation hazard symbol is to be oriented with one blade pointed downward and centred on the vertical axis.
- (3) No wording is to be superimposed on the radiation hazard symbol.
- (4) The three blades and the centre disc of the radiation hazard symbol are to be black or magenta and located on a yellow background.

26 Feb 93 cR-1.1 Reg 1 s20.

PART III
Non-ionizing Radiation
 ULTRAVIOLET RADIATION

Exposure limits to ultraviolet radiation - general

21(1) Subject to subsection (4) and sections 22 and 23, in any place of employment where an occupational worker may be exposed to ultraviolet radiation from ultraviolet radiation equipment, the owner of the equipment shall ensure that:

- (a) with respect to monochromatic ultraviolet radiation in the wavelength range from 180 to 315 nanometres, the total radiant exposure of an occupational worker's unprotected eyes or skin, in any period of eight hours, does not exceed the values set out in Table 3;
- (b) with respect to non-monochromatic ultraviolet radiation in the wavelength range from 180 to 315 nanometres, the total radiant exposure of an occupational worker's unprotected eyes or skin, in any period of eight hours, determined in accordance with subsection (2), does not exceed 30 joules per square metre;

(c) with respect to ultraviolet radiation with a wavelength greater than 315 nanometres:

- (i) the total radiant exposure of an occupational worker's unprotected eyes or skin, in any period of less than 1,000 seconds, does not exceed 10^4 joules per square metre; and
- (ii) the total irradiance on an occupational worker's unprotected eyes or skin, in any period of 1,000 seconds or more, does not exceed 10 watts per square metre.

(2) For the purposes of clause (1)(b), radiant exposure is the value of D_{uv} , calculated in accordance with the formula:

$$D_{uv} = E_{eff} \times t$$

where:

D_{uv} is the radiant exposure in joules per square metre;

E_{eff} is the effective irradiance relative to monochromatic radiation of wavelength 270 nanometres, calculated in accordance with subsection (3) and expressed in watts per square metre;

t is the time of exposure, expressed in seconds.

(3) For the purposes of subsection (2), effective irradiance is calculated by summing the relative contributions from all the spectral components, appropriately weighted according to their relative spectral effectiveness, in accordance with the formula:

$$E_{eff} = \sum E_{\lambda} S_{\lambda} \Delta\lambda$$

where:

E_{eff} is the effective irradiance relative to monochromatic radiation of wavelength 270 nanometres, expressed in watts per square metre;

E_{λ} is the spectral irradiance at wavelength λ , expressed in watts per square metre per nanometre;

S_{λ} is the relative spectral effectiveness determined from Table 3;

$\Delta\lambda$ is the band width in nanometres associated with each measured or calculated value of E_{λ} .

(4) Where the spectral composition of the radiation is not known, the owner of the equipment shall ensure that the total radiant exposure of an occupational worker's unprotected eyes or skin in any period of eight hours does not exceed 30 joules per square metre.

(5) For the purposes of subsection (4), an exposure for eight hours to a maximum continuous irradiance of 1 milliwatt per square metre is deemed to be equal to a total radiant exposure of 30 joules per square metre.

(6) In any place where a member of the public may be exposed to ultraviolet radiation from ultraviolet radiation equipment, the owner of the equipment shall ensure that the total radiant exposure of a member of the public does not exceed the exposure limits for occupational workers established by this section.

(7) Subsection (6) does not apply with respect to persons who:

(a) voluntarily undergo exposure to ultraviolet radiation in a commercial tanning salon; or

(b) receive exposure to ultraviolet radiation in the course of diagnosis or treatment carried out by or under the direction of a duly qualified medical practitioner.

26 Feb 93 cR-1.1 Reg 1 s21.

Exposure limits to ultraviolet radiation - photosensitivity

22(1) Where the conditions at a place of employment may lead to chemically-induced photosensitivity in an occupational worker, the owner of ultraviolet radiation equipment shall ensure that the exposure to ultraviolet radiation of the occupational worker's eyes or skin, in any period of eight hours, does not exceed the values that are recommended by the chief occupational medical officer.

(2) Values recommended by the chief occupational medical officer for the purposes of subsection (1) should not exceed the values set out in Table 3.

(3) Where an owner of ultraviolet radiation equipment knows or ought to know that an occupational worker shows inherited photosensitivity to ultraviolet radiation or is under treatment with a photosensitizing drug, the owner shall ensure that:

(a) the worker's exposure to ultraviolet radiation is limited in accordance with the advice of a duly qualified medical practitioner; or

(b) the worker is issued with any eye and skin protection that is specified by:

(i) a duly qualified medical practitioner; or

(ii) an officer.

26 Feb 93 cR-1.1 Reg 1 s22.

Protection where exposure limits cannot be complied with

23 Where the exposure limits set out in section 21 and subsection 22(1) cannot be complied with, an owner of ultraviolet radiation equipment shall issue to each occupational worker whose exposure to ultraviolet radiation may exceed those limits:

(a) any eye and skin protection that is specified by:

(i) a duly qualified medical practitioner; or

(ii) an officer; and

(b) if required by an officer, a personal monitoring device to evaluate the exposure of the worker to ultraviolet radiation.

26 Feb 93 cR-1.1 Reg 1 s23.

COMMERCIAL TANNING SALONS

Safety features

24 The owner of a commercial tanning salon shall ensure that each suntanning enclosure is designed, constructed and maintained to include:

- (a) a ready means of exit from the enclosure;
- (b) a control by which the person being exposed may easily turn off the suntanning equipment without:
 - (i) leaving the enclosure;
 - (ii) disconnecting the electrical plug; or
 - (iii) removing the ultraviolet lamp or lamps; and
- (c) a timer that:
 - (i) is adjustable so that times can be preset;
 - (ii) cannot be set for an interval greater than the maximum safe exposure time mentioned in clause 27(1)(e);
 - (iii) terminates the exposure automatically at the end of the preset time; and
 - (iv) does not automatically reset and cause radiation emission to resume when emission has been terminated by the timer.

26 Feb 93 cR-1.1 Reg 1 s24.

Protective eyewear

25(1) The owner of a commercial tanning salon shall ensure that sets of protective eyewear meeting the requirements of subsection (2) are:

- (a) available in numbers sufficient for the maximum number of persons who may use the suntanning salon at the same time; and
 - (b) provided to persons for use during exposure to ultraviolet radiation at the suntanning salon.
- (2) Sets of protective eyewear are to have a spectral transmittance that:
- (a) does not exceed a value of 0.001 over the wavelength range from 200 nanometres to 320 nanometres;
 - (b) has a value of 0.01 for ultraviolet wavelengths greater than 320 nanometres; and

(c) permits the user to see clearly enough to read the electro-optical radiation warning sign required by section 28 and to reset the timer.

26 Feb 93 cR-1.1 Reg 1 s25.

Instructions

26(1) Subject to subsection (3), the owner of a commercial tanning salon shall ensure that the manufacturer's full instructions for the operation and safe use of the suntanning equipment are posted in a location that is readily and clearly seen by persons who may use the equipment.

(2) Instructions required by subsection (1) are to include:

(a) statements with respect to:

(i) the exposure positions and directions for determining them;

(ii) the maximum exposure time;

(iii) the minimum interval between consecutive exposures; and

(iv) the maximum number of persons who may be exposed to ultraviolet radiation from the sunlamp at the same time; and

(b) an electro-optical radiation warning sign that meets the requirements of section 28.

(3) In the case of suntanning equipment that is custom-built by or for the owner, the owner shall, before the equipment is used:

(a) develop full instructions for the operation and safe use of the equipment;

(b) obtain the approval of an officer for the instructions mentioned in clause (a); and

(c) post the approved instructions in accordance with subsection (1).

26 Feb 93 cR-1.1 Reg 1 s26.

Information on suntanning enclosure

27(1) Subject to subsection (3), the owner of a commercial tanning salon shall ensure that each suntanning enclosure has the following information from the manufacturer marked on its external surface:

(a) the name and address of the manufacturer;

(b) the model designation, the serial number and the month and year of manufacture;

(c) the recommended exposure positions and the directions for determining the recommended exposure positions;

(d) a warning that the use of exposure positions other than the recommended exposure positions may result in overexposure;

(e) the maximum safe exposure time in minutes;

- (f) the minimum interval between consecutive exposures;
 - (g) the type and model designation of each ultraviolet lamp intended to be used in the sunlamp unless the sunlamp is manufactured, maintained and serviced by the same manufacturer as the suntanning enclosure;
 - (h) a warning that the instructions accompanying the sunlamp should always be followed to avoid or minimize potential injury; and
 - (i) an electro-optical radiation warning sign that meets the requirements of section 28.
- (2) The information mentioned in subsection (1) is to be:
- (a) clearly legible; and
 - (b) readily accessible to view by the user immediately before using the sunlamp.
- (3) In the case of suntanning equipment that is custom-built by or for the owner, the owner shall, before the equipment is used:
- (a) develop for the equipment the information required by subsection (1), other than the model designation and serial number;
 - (b) obtain the approval of an officer for the information mentioned in clause (a); and
 - (c) mark the approved information on the external surface of the equipment.

26 Feb 93 cR-1.1 Reg 1 s27.

Electro-optical radiation warning sign

28 An electro-optical radiation warning sign:

- (a) is to bear the electro-optical radiation warning symbol illustrated in Figure 2;
- (b) is to be shown in two contrasting colours;
- (c) is to be clearly visible and identifiable from the exposure position;
- (d) is to bear the words "WARNING - ULTRAVIOLET RADIATION - FOLLOW INSTRUCTIONS - FAILURE TO USE PROTECTIVE EYEWEAR MAY RESULT IN SEVERE BURNS OR OTHER EYE INJURY - IF DISCOMFORT DEVELOPS, DISCONTINUE USE AND CONSULT A PHYSICIAN";
- (e) is to incorporate statements indicating that:
 - (i) as with natural sunlight, overexposure may cause eye injury and sunburn;
 - (ii) repeated exposure may cause premature aging of the skin and skin cancer;
 - (iii) medications or cosmetics applied to the skin may increase sensitivity to ultraviolet light;

- (iv) a person who does not tan in the sun most likely will not tan from the use of this device;
 - (v) a person who has a history of skin problems or who has a skin that is especially sensitive to sunlight should consult a physician before use; and
 - (vi) overexposure should be avoided; and
- (f) is to have no outer dimensions that are less than two centimetres.

NOTE: Suntanning equipment sold in Canada is required to meet the requirements of the *Radiation Emitting Devices Act (Canada)* and the regulations made pursuant to that Act. *The Radiation Health and Safety Regulations* impose essentially the same requirements on the use and operation of suntanning equipment.

26 Feb 93 cR-1.1 Reg 1 s28.

LASERS

Laser classification

29(1) Lasers and laser devices are to be classified in accordance with International Electrotechnical Commission IEC Standard, Publication 825, first edition, 1984, entitled “Radiation safety of laser products, equipment classification, requirements and user’s guide”, published by Bureau Central de la Commission Electrotechnique Internationale, 3, rue de Varembe, Geneva, Switzerland.

- (2) An owner of a laser or laser device shall ensure that:
- (a) a label showing the appropriate laser class:
 - (i) is clearly displayed on the laser or laser device;
 - (ii) is:
 - (A) fixed to the laser or laser device by the manufacturer; or
 - (B) if there is no label fixed to the laser or laser device by the manufacturer, in the form of a certificate that is fixed to the laser or laser device and signed by the owner or by a laser safety officer who is:
 - (I) designated in writing by the owner; and
 - (II) responsible for the laser or laser device; and
 - (b) any labels required by subsections (3) to (8) are clearly displayed on the laser or laser device.
- (3) A class I laser or laser device is to have a yellow explanatory label designed in accordance with Figure 3, bearing the words “CLASS I LASER DEVICE” in Position 2.

- (4) A class I laser device that incorporates a class IV laser is to have a yellow explanatory label designed in accordance with Figure 3, bearing the words “CLASS I/IV LASER SYSTEM” in Position 2.
- (5) A class II laser or laser device is to have:
- (a) a label bearing the laser hazard symbol illustrated in Figure 4; and
 - (b) a yellow explanatory label designed in accordance with Figure 3, bearing the words:
 - (i) “LASER RADIATION - DO NOT STARE INTO BEAM” in Position 1; and
 - (ii) “CLASS II LASER DEVICE” in Position 2.
- (6) A class IIIA laser or laser device is to have:
- (a) a label bearing the laser hazard symbol illustrated in Figure 4; and
 - (b) a yellow explanatory label designed in accordance with Figure 3, bearing the words:
 - (i) “LASER RADIATION - DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS” in Position 1; and
 - (ii) “CLASS IIIA LASER DEVICE” in Position 2.
- (7) A class IIIB laser or laser device is to have:
- (a) a label bearing the laser hazard symbol illustrated in Figure 4; and
 - (b) a red explanatory label designed in accordance with Figure 5, bearing the words:
 - (i) “LASER RADIATION - AVOID EXPOSURE TO BEAM” in Position 1; and
 - (ii) “CLASS IIIB LASER DEVICE” in Position 2.
- (8) A class IV laser or laser device is to have:
- (a) a label bearing the laser hazard symbol illustrated in Figure 4; and
 - (b) a red explanatory label designed in accordance with Figure 5, bearing the words:
 - (i) “LASER RADIATION - AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED BEAM” in Position 1; and
 - (ii) “CLASS IV LASER DEVICE” in Position 2.

26 Feb 93 cR-1.1 Reg 1 s29.

Duty to inform

30 An owner of a laser or a laser device shall:

- (a) fully inform all occupational workers who may be exposed to radiation from a laser or laser device of class II, IIIA, IIIB or IV as to the hazards of this radiation under the conditions of use; and

(b) without limiting the generality of clause (a), draw the attention of the occupational workers to the viewing restrictions that are indicated on the laser classification label.

26 Feb 93 cR-1.1 Reg 1 s30.

Viewing of lasers by workers

31(1) An owner of a laser or a laser device shall ensure that no occupational worker at any time views:

- (a) the direct beam; or
- (b) in the case of a class IIIB or class IV laser or laser device, a specular reflection of the direct beam.

(2) Where an occupational worker may view a diffuse reflection of the direct beam from a class IIIB or IV laser or laser device, the owner shall ensure that:

- (a) the worker wears approved eye protection; or
- (b) in the case of a class IIIB laser or laser device:
 - (i) the minimum viewing distance is 50 metres;
 - (ii) the maximum viewing time is 10 seconds; and
 - (iii) the minimum diffuse image diameter is 5.5 millimetres.

26 Feb 93 cR-1.1 Reg 1 s31.

Viewing of lasers by public

32(1) With respect to class III and class IV lasers or laser devices other than lasers or laser devices used for a medical procedures prescribed by duly qualified medical practitioners, the owner of a laser or laser device shall take all necessary precautions to ensure that no member of the public views:

- (a) the direct beam of the laser;
- (b) in the case of a class IIIA laser or laser device, the specular reflection of the direct beam; or
- (c) in the case of a class IIIB or a class IV laser or laser device, the diffuse reflection or the specular reflection of the direct beam.

(2) Where it is possible for a member of the public to view the direct beam of a class II laser or laser device, the owner of the laser or laser device shall prominently display, at the approaches to the area where the direct laser beam is present, a notice that draws attention to the need to avoid looking directly into the beam or its specular reflection.

26 Feb 93 cR-1.1 Reg 1 s32.

R-1.1 REG 1**RADIATION HEALTH AND SAFETY****Exposure to class III or IV lasers**

33 The owner of a class III or class IV laser or laser device shall ensure that no part of the body of any person is deliberately exposed to the direct beam of the laser except under the direction of:

- (a) a duly qualified medical practitioner; or
- (b) a dentist who is licensed pursuant to *The Dental Profession Act, 1978*.

26 Feb 93 cR-1.1 Reg 1 s33.

Laser hazard sign

34(1) Where a laser or laser device of class II, IIIA, IIIB or IV with an accessible beam, other than a laser scanner, is used in a room, the owner shall ensure that a sign bearing the laser hazard symbol illustrated in Figure 4 and the words "LASER RADIATION" is displayed prominently at all entrances.

(2) Where a laser or laser device of class II, IIIA, IIIB or IV with an accessible beam, other than a laser scanner, is used in an open area, the owner shall:

- (a) ensure that:
 - (i) a barrier is erected around the area; and
 - (ii) a sign bearing the laser hazard symbol illustrated in Figure 4 and the words "LASER RADIATION" is placed at all normal points of access to the area; or
- (b) if compliance with clause (a) is not practicable, ensure that the operator takes other appropriate steps to make all persons present in the area aware of the existence of the laser hazard.

26 Feb 93 cR-1.1 Reg 1 s34.

Qualifications of operators

35 The owner of a class IIIB or class IV laser or laser device shall ensure that each operator of the laser or laser device:

- (a) is:
 - (i) a duly qualified medical practitioner;
 - (ii) a dentist who is licensed pursuant to *The Dental Profession Act, 1978*;
 - (iii) a veterinarian who is registered pursuant to *The Veterinarians Act, 1987*;
 - (iv) a physical therapist who is registered pursuant to *The Physical Therapists Act, 1984*; or
 - (v) a person who:
 - (A) has been trained to carry out the procedures for which that laser or laser device is to be used; and

(B) can demonstrate to the satisfaction of an officer his or her knowledge of the equipment, the biological effects associated with its use and the necessary safety procedures; or

- (b) works under the direct supervision of a person described in clause (a).

26 Feb 93 cR-1.1 Reg 1 s35.

LASER SCANNERS

Emission limits

36(1) An owner of a laser scanner shall ensure that the scanner is designed, constructed and maintained so that the intensity of laser radiation at all accessible locations, measured within a stationary circular area of 0.385 square centimetres and averaged over that area, does not exceed the limits set out in subsection (2):

- (a) under the conditions of use specified by the manufacturer; and
 (b) when the scanner is fully assembled and operating with its service controls and user controls adjusted to yield the maximum emission.

(2) For the purposes of subsection (1), the intensity of laser radiation is not to exceed:

- (a) an integrated irradiance of 5.0×10^{-7} joules per square centimetre during any interval of less than 1.8×10^{-5} seconds;
 (b) an integrated irradiance of $1.8 \times 10^{-3}t^{3/4}$ joules per square centimetre during any interval that is:
 (i) greater than 1.8×10^{-5} seconds; and
 (ii) equal to or less than 10 seconds;

where t is the duration of the interval in seconds;

- (c) an integrated irradiance of 1.0×10^{-2} joules per square centimetre during any interval that is:
 (i) greater than 10 seconds; and
 (ii) equal to or less than 1.0×10^4 seconds; and
 (d) an irradiance of 1.0×10^{-6} watts per square centimetre during any interval that is greater than 10^4 seconds.

26 Feb 93 cR-1.1 Reg 1 s36.

Safety features

37(1) In this section:

- (a) “**protective enclosure**” means a structure that encloses the components of a laser scanner and its accessory components and restricts the emission of laser radiation to one or more exit apertures;

- (b) “**protective housing**” means a structure that encloses the components of a laser and prevents the emission of laser radiation except through an exit aperture.
- (2) The owner of a laser scanner shall ensure that the scanner incorporates the following safety features:
- (a) a switch or other control by which the scanner may be turned on or off;
 - (b) a protective housing;
 - (c) a protective enclosure; and
 - (d) one or more safety interlocks.
- (3) The owner of a laser scanner shall ensure that the scanner is designed, constructed and maintained so that:
- (a) all controls, meters, lights and other indicators are readily seen and clearly labelled to indicate their function; and
 - (b) the failure or malfunction of any component of the scanner does not result in leakage of laser radiation in excess of the limits set out in section 36.
- (4) If a laser scanner is provided with means to defeat or bypass a safety interlock for maintenance purposes, the owner shall ensure that:
- (a) the scanner incorporates a visual or aural indicator that operates when an interlock is defeated or bypassed; and
 - (b) no removed or displaced portion of the protective enclosure can be replaced while an interlock is defeated or bypassed.

26 Feb 93 cR-1.1 Reg 1 s37.

Labelling

- 38(1) An owner of a laser scanner shall ensure that:
- (a) the information set out in subsection (3); and
 - (b) a label that:
 - (i) bears the laser hazard symbol illustrated in Figure 4; and
 - (ii) is designed in accordance with subsection (4);
- are permanently affixed to and clearly visible on the external surface of the scanner.
- (2) An owner of a laser scanner shall ensure that the label described in clause (1)(b) is permanently affixed to surfaces inside the scanner so as to be clearly visible if any removable or displaceable portion of the protective enclosure is removed or displaced.
- (3) The following information is required for the purposes of subsection (1):
- (a) the name and address of the manufacturer of the scanner;
 - (b) the name and address of the distributor, if the distributor is anyone other than the manufacturer;

- (c) the model designation, the serial number and the month and year of manufacture;
 - (d) in the case of pulsed lasers, the energy per pulse, pulse duration and pulse repetition rate;
 - (e) in the case of non-pulsed lasers, the output power; and
 - (f) the name and address of the manufacturer of the lasers used in the scanner.
- (4) The label described in clause (1)(b):
- (a) is to be shown in two contrasting colours;
 - (b) is to be clearly visible and identifiable from a distance of one metre;
 - (c) is to have no outer dimension that is less than two centimetres; and
 - (d) is to bear the words “CAUTION - HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED”.

26 Feb 93 cR-1.1 Reg 1 s38.

Manuals

39 An owner of a laser scanner shall ensure that the following manuals for the scanner are readily available at the place where the scanner is used:

- (a) an operation manual that contains instructions for:
 - (i) the installation;
 - (ii) the operation; and
 - (iii) the detection of any malfunction;
 of the scanner; and
- (b) a servicing manual that contains:
 - (i) details of the electronic and mechanical control systems;
 - (ii) instructions for service adjustments and service procedures, including warnings or precautions to take to avoid possible exposure to laser radiation or to other electromagnetic radiation; and
 - (iii) a schedule of maintenance requirements.

NOTE: Laser scanners sold in Canada are required to meet the requirements of the *Radiation Emitting Devices Act (Canada)* and the regulations made pursuant to that Act. *The Radiation Health and Safety Regulations* impose essentially the same requirements on the use and operation of laser scanners.

26 Feb 93 cR-1.1 Reg 1 s39.

LASER LIGHT SHOWS

Statement re laser light shows

40(1) For the purposes of section 8 of the Act, an owner of a laser light show that is permanently installed shall:

- (a) furnish the department with a statement in Form A not less than 30 days before the equipment is used; and
 - (b) notify the department of any change in the information supplied in Form A within seven days of the occurrence of the change.
- (2) For the purposes of section 8 of the Act, an owner of a mobile laser light show shall, not less than seven days before the equipment is used within Saskatchewan:
- (a) notify the department of the time and place of all displays that are to be presented while the show is within Saskatchewan; and
 - (b) furnish the department with:
 - (i) a statement in Form A; and
 - (ii) a floor plan showing the laser working area and the beam termination points.
- (3) Where it is not possible for an owner of a mobile laser light show to give seven days' notice in accordance with clause (2)(a), an officer may permit the owner to present a light show if the owner presents evidence satisfactory to the officer to demonstrate that no hazard to the public will result from the light show.

26 Feb 93 cR-1.1 Reg 1 s40.

Standards for laser light shows

41(1) An owner of a laser light show shall ensure that only lasers or laser devices that operate within the wavelength range from 400 to 700 nanometres are used in the laser light show.

(2) An operator of a laser light show shall ensure that the intensity of laser radiation measured at all locations that are normally accessible to the audience or the performers does not exceed the limits set out in Table 4.

(3) An owner of a laser light show shall:

- (a) during set-up when the operator must have access to laser beams, ensure that neither the operator nor any other person is inadvertently exposed to laser radiation of an intensity that exceeds the limits set out in Table 4;
- (b) ensure that the laser projection equipment incorporates safety features that will prevent the exposure of any person to laser radiation of an intensity that exceeds the limits set out in Table 4 in the event of the failure of any component of the equipment, including the scanning mechanism;
- (c) ensure that laser radiation power from the beam:
 - (i) is measured; and

- (ii) does not exceed 1 milliwatt:
 - (A) at any point that is less than 3 metres above any surface to which the audience has access; or
 - (B) at any point that is less than 2.5 metres laterally from any position to which the audience has access;
 unless physical barriers prevent access by the audience to that position;
 - (d) ensure that the laser projection equipment is provided with one or more controls that:
 - (i) are readily accessible to the operator; and
 - (ii) terminate the laser radiation emission in the event of an emergency created by equipment malfunction, audience unruliness or other unsafe conditions;
 - (e) ensure that one person has been designated as operator to be in charge of the equipment during the show; and
 - (f) ensure that a notice is prominently displayed forbidding the use of direct optical viewing devices such as binoculars and telescopes during the operation of the laser light show.
- (4) For the purposes of clause (3)(c), the measurement of laser radiation power must be made with a detector having a circular aperture with a diameter of 7 millimetres and an acceptance solid angle of 2θ steradian.

26 Feb 93 cR-1.1 Reg 1 s41.

ULTRASOUND EQUIPMENT

Statement re medical ultrasound equipment

42 For the purposes of section 8 of the Act, an owner of medical ultrasound equipment shall:

- (a) within 30 days after the day on which:
 - (i) a unit of medical ultrasound equipment comes under the owner's control; or
 - (ii) a unit of medical ultrasound equipment that is under the owner's control is substantially altered;

furnish the department with a statement in Form B with respect to the unit of medical ultrasound equipment; and

- (b) during the month of January in each year, furnish the department with a statement in Form B with respect to all medical ultrasound equipment then under the owner's control.

26 Feb 93 cR-1.1 Reg 1 s42.

Qualifications of operators

43 An owner of medical ultrasound equipment shall ensure that each operator of the equipment is:

- (a) a duly qualified medical practitioner;
- (b) a medical ultrasonographer who possesses the qualifications necessary for membership in the Saskatchewan Association of Diagnostic Medical Sonographers;
- (c) a physical therapist who is registered pursuant to *The Physical Therapists Act, 1984*; or
- (d) a person who:
 - (i) has been trained to carry out the procedures for which the equipment is to be used; and
 - (ii) can demonstrate to the satisfaction of an officer his or her knowledge of the equipment, the biological effects associated with its use and the necessary safety procedures.

26 Feb 93 cR-1.1 Reg 1 s43.

Code of practice for ultrasound procedures

44(1) An owner of medical ultrasound equipment shall ensure that a code of practice for quality assurance procedures is prepared that:

- (a) is acceptable to an officer in form and content; and
 - (b) meets the requirements of subsections (2) and (3).
- (2) A quality assurance manual shall clearly specify the quality assurance procedures that are to be followed by the staff who are responsible for the use of the equipment.
- (3) The contents of a quality assurance manual are to be appropriate to:
- (a) the extent of use of ultrasound procedures in the hospital, medical clinic or other place; and
 - (b) the level of expertise of the staff.

26 Feb 93 cR-1.1 Reg 1 s44.

Occupational exposure to airborne ultrasound

45(1) An owner of equipment that is capable of generating airborne ultrasound shall ensure that, in any area to which a person may have access, the intensity levels of airborne ultrasound, expressed as decibel levels referred to a reference level of 2×10^{-5} newtons per square metre, do not exceed:

- (a) 75 decibels in:
 - (i) the octave band centred on 16 kilohertz;

- (ii) one-third octave bands centred on frequencies up to and including 20 kilohertz; or
 - (iii) narrow bands centred on frequencies up to 22.5 kilohertz; or
- (b) 110 decibels in any octave band centred at or above a frequency of 22.5 kilohertz.
- (2) An operator of equipment that is capable of generating airborne ultrasound shall ensure that it is used so that, in any area to which a person may have access, intensity levels of airborne ultrasound, expressed as decibel levels referred to a reference level of 2×10^{-5} newtons per square metre, do not exceed the levels set out in clause (a).

26 Feb 93 cR-1.1 Reg 1 s45.

Occupational exposure to contact ultrasound

46(1) Subject to subsection (2), an owner of equipment that incorporates an ultrasonic generator shall take all necessary steps to ensure that no occupational worker is exposed to irradiation of any tissue at an intensity greater than 1 kilowatt per square metre.

(2) Where the total exposure time of an occupational worker in a working day is less than 500 seconds, any product of ultrasound intensity and exposure time that produces an energy deposition in tissue that does not exceed 5×10^5 joules per square metre is acceptable.

26 Feb 93 cR-1.1 Reg 1 s46.

MICROWAVE RADIATION

Microwave radiation - exposure limits

47(1) With respect to the frequency range from 1.5 gigahertz to 300 gigahertz, an owner of equipment that generates radio frequency fields shall ensure that:

- (a) subject to subsection (2), no unprotected occupational worker is subjected to continuous radio frequency radiation with a power density greater than 50 watts per square metre;
 - (b) where power densities greater than those permitted pursuant to clause (a) are unavoidable, approved protective clothing is provided for the use of the occupational worker; and
 - (c) except for purposes of medical diagnosis or therapy, no member of the public is at any time subjected to microwave radiation with a power density greater than one tenth of that allowed pursuant to clause (a) for an unprotected occupational worker.
- (2) For the purposes of clause (1)(a), power densities of up to 300 watts per square metre are permissible for periods not exceeding 10 minutes in every hour.

(3) Where a microwave source is capable of producing power densities greater than the values mentioned in clause (1)(c) or subsection (2), the owner shall ensure that a sign bearing the microwave warning symbol illustrated in Figure 6 and the words "MICROWAVE RADIATION" is prominently displayed in any area to which a person may have access.

26 Feb 93 cR-1.1 Reg 1 s47.

MICROWAVE OVENS

Leakage radiation limits

48(1) An owner of a microwave oven shall ensure that the oven is designed, constructed and maintained so that:

- (a) under the conditions of use specified by the manufacturer and while it is operating with its service controls and user controls adjusted to yield the maximum output, the leakage radiation at all points at least 5 centimetres from the external surface of the oven:
 - (i) in the case of an oven that is designed for cooking and has a total microwave power generating capacity of 1.5 kilowatts or less, does not exceed 15 watts per square metre with the test load placed in the centre of the oven; and
 - (ii) in any other case, does not exceed 50 watts per square metre with the test load specified by the manufacturer; and
 - (b) where the outer enclosure is removed and the oven is operating with its service controls and user controls adjusted to yield the maximum output, the leakage radiation at all points at least 5 centimetres from every mechanical or electrical part of the oven that is accessible to the user of the oven, including the waveguide, the cavity, the cavity seam, the magnetron and the magnetron to waveguide connection, does not exceed 50 watts per square metre with the test load in the oven.
- (2) For the purposes of subsection (1), leakage radiation is to be measured using:
- (a) a test load:
 - (i) that consists of 275 ± 15 millilitres of water at an initial temperature of $20 \pm 5^\circ\text{C}$ for an oven that:
 - (A) is designed for cooking; and
 - (B) has a total microwave power generating capacity of 1.5 kilowatts or less; or
 - (ii) that consists of the substance specified by the manufacturer in the quantity specified by the manufacturer in any other case; and
 - (b) an instrument for measuring that:
 - (i) is capable of measuring a power density of 10 watts per square metre with an accuracy of ± 2 decibels or better; and

- (ii) has an indicator with a response time that does not exceed 3 seconds.

26 Feb 93 cR-1.1 Reg 1 s48.

Safety features

49(1) An owner of a microwave oven shall ensure that the oven incorporates the following safety features:

- (a) a device or indicator for each microwave power source that provides a visible indication of the status of operation of the oven;
- (b) if the power can be varied by a user control, an indicator to show the level of microwave power applied to the cavity;
- (c) if the oven has a total microwave generating capacity of 25 kilowatts or more, a lock on the control panel that requires the insertion of a key before microwave power can be generated;
- (d) if access to the cavity is not by means of a conveyor:
 - (i) a door constructed and positioned to ensure that any leakage radiation does not exceed the limits prescribed by clause 48(1)(a);
 - (ii) at least two electrically and mechanically independent interlocks positioned to ensure that:
 - (A) the door cannot be opened until the microwave power generating component has been turned off; and
 - (B) the microwave power generating component cannot be turned on while the door is open; and
 - (iii) a device that:
 - (A) monitors one or more of the interlocks; and
 - (B) renders the oven inoperable when a monitored interlock fails or is otherwise rendered inoperable;
- (e) a covering or baffle arrangement placed over any viewing screen, vent or access port in the cavity wall, other than an opening through which conveyor-borne material enters or leaves the cavity, that prevents the insertion of any object into the cavity while the microwave power source is in operation; and
- (f) components and shields that are constructed and positioned so that adjustments to the service controls and user controls to yield the maximum output do not produce radiation leakage that exceeds the limits set out in clause 48(1)(a).

(2) An owner of a microwave oven equipped with interlocks shall ensure that the failure of any single component of the oven does not cause the interlock system to fail.

26 Feb 93 cR-1.1 Reg 1 s49.

Labelling

50(1) An owner of a microwave oven shall ensure that the oven has the following information permanently affixed to and clearly visible on its external surface:

- (a) the name of the manufacturer and the place of manufacture;
- (b) the year and month of manufacture;
- (c) the model number and serial number;
- (d) the type of microwave power generating component and its normal:
 - (i) operating voltage;
 - (ii) operating frequency; and
 - (iii) output;
- (e) the specifications for the test load mentioned in subclause 48(2)(a)(ii).

(2) An owner of a microwave oven shall ensure that a label bearing the microwave warning symbol illustrated in Figure 6 is permanently affixed:

- (a) to the external surface; and
 - (b) if access to the cavity is by means of a conveyor, adjacent to each entry and exit port.
- (3) For the purposes of subsection (2), the label:
- (a) is to be clearly visible and identifiable from a distance of one metre;
 - (b) is to have all outer dimensions two centimetres or greater; and
 - (c) is to bear the words "CAUTION - MICROWAVES".

NOTE: Microwave ovens sold in Canada are required to meet the requirements of the *Radiation Emitting Devices Act (Canada)* and the regulations made pursuant to that Act. *The Radiation Health and Safety Regulations* impose essentially the same requirements on the use and operation of microwave ovens.

26 Feb 93 cR-1.1 Reg 1 s50.

OTHER NON-IONIZING RADIATION

Radio frequency fields

51(1) An owner of equipment that generates radio frequency fields in the frequency range from 10 kilohertz to 1,500 megahertz shall ensure that:

- (a) subject to subclause (b)(ii), the maximum electric field intensity to which an occupational worker may be exposed does not exceed the value set out in Table 5; and
- (b) the maximum electric field intensity to which:
 - (i) a member of the public; or
 - (ii) an operator of a video display unit;

may be exposed does not exceed one tenth of the value set out in Table 5.

(2) An owner of equipment that generates radio frequency fields in the frequency range from 10 kilohertz to 1,500 megahertz shall ensure that:

- (a) subject to subclause (b)(ii), the maximum magnetic field intensity to which an occupational worker may be exposed does not exceed the value set out in Table 5; and
- (b) the maximum magnetic field intensity to which:
 - (i) a member of the public; or
 - (ii) an operator of a video display unit;

may be exposed does not exceed one tenth of the value set out in Table 5.

26 Feb 93 cR-1.1 Reg 1 s51.

PART IV Ionizing and Non-ionizing Radiation

Design change notification

52(1) Where:

- (a) subsequent to its manufacture, radiation equipment or associated apparatus or any component of that equipment or apparatus has been discovered by the manufacturer, vendor, owner or operator to be hazardous; and
- (b) it has been necessary to remove or replace any assembly or components of the equipment or apparatus;

the vendor, owner or operator shall give notice in writing to the department in accordance with subsection (2).

(2) A notice required pursuant to subsection (1) is to include:

- (a) the name and mailing address of the vendor;
- (b) the name and address of the owner to whom the equipment, apparatus or component is to be or has been transferred;
- (c) the identification and brand name of the equipment, apparatus or component;
- (d) the model and serial number or other identification of the equipment, apparatus or component; and
- (e) the actions, if any, that have been taken by the vendor to:
 - (i) remove from operation or to make safe the equipment, apparatus or component; and
 - (ii) prevent any occurrence of the hazard in other similar equipment.

26 Feb 93 cR-1.1 Reg 1 s52.

Maintenance schedules

53(1) Every vendor of radiation equipment or associated apparatus shall, within 30 days of an officer's request, provide the officer with a copy of any recommended maintenance schedules or inspection check lists that have been established by the manufacturer for that equipment or apparatus.

(2) Every owner of radiation equipment or associated apparatus shall, within 30 days of an officer's request, provide the officer with a copy of any recommended maintenance schedules or inspection check lists that have been established by the manufacturer or developed by the owner for that equipment or apparatus.

26 Feb 93 cR-1.1 Reg 1 s53.

Accident reporting

54(1) Where an accident that involves the manufacturing, testing or use of radiation equipment but does not involve radiation:

- (a) is reported to or known to a manufacturer, vendor, owner or operator of radiation equipment or associated apparatus; and
- (b) causes injury to any person;

the vendor, owner or operator, as the case may be, shall, without delay, give written notice to the department in accordance with subsection (2).

(2) A notice required pursuant to subsection (1) is to include:

- (a) the day and location at which the accident occurred and the name of the person giving the notice;
- (b) the name of the manufacturer and the type and model number of the radiation equipment and associated apparatus involved;
- (c) the circumstances surrounding the accident;
- (d) the number of persons involved or harmed, the nature and magnitude of their injuries and, if requested by an officer, the names of the persons involved or harmed; and
- (e) the actions, if any, that have been taken by the manufacturer, vendor or owner, as the case may be, to control, correct or eliminate the causes and to prevent recurrence of the accident.

26 Feb 93 cR-1.1 Reg 1 s54.

Accidental radiation exposure

55(1) An owner of radiation equipment shall take all reasonable steps to minimize the possibility of unnecessary irradiation of occupational workers or members of the public arising from malfunction of the equipment or any associated apparatus.

(2) Where a malfunction of radiation equipment or associated apparatus leads to the possibility of unnecessary irradiation of an occupational worker or a member of the public, the owner shall immediately take all necessary steps to:

- (a) minimize the risk of accidental radiation exposure of any individual; and
- (b) terminate the risk as quickly as possible.

- (3) Where the risk described in subsection (2):
- (a) results in the irradiation:
 - (i) of an occupational worker by ionizing radiation to an extent that is equal to or greater than 10 millisieverts; or
 - (ii) of a member of the public by ionizing radiation to an extent that is equal to or greater than 0.25 millisieverts; and
 - (b) cannot be completely terminated within a period of six hours;

the owner shall immediately notify an officer and confirm this notification in writing within 48 hours.

- (4) Where the risk described in subsection (2):
- (a) results in the irradiation of an occupational worker or a member of the public by a form of non-ionizing radiation to an extent that is equal to or greater than the exposure limit prescribed in Part III for that form of radiation; and
 - (b) cannot be terminated within a period of six hours;

the owner shall immediately notify an officer and confirm this notification in writing within 48 hours.

- (5) Where the risk described in subsection (2) has been completely terminated within six hours, the owner shall, within 10 days after the malfunction, make a full report to the department of:

- (a) the circumstances of the malfunction; and
- (b) the actions taken to eliminate the risk.

- (6) An owner of radiation equipment shall inform the department immediately if an injury to any person is reported to the owner by a duly qualified medical practitioner as an injury that is known or suspected to have been caused or exacerbated by exposure of the person to radiation equipment that is under the control of the owner.

26 Feb 93 cR-1.1 Reg 1 s55.

Radiation warning signs

56(1) In addition to any other requirement of these regulations with respect to signs or notices, an officer may require an owner of radiation equipment or associated apparatus to display one or more of the following to demarcate an area where a hazard from radiation exists:

- (a) a warning notice issued by the department;
- (b) a sign in the form specified by the officer.

- (2) An owner of radiation equipment or associated apparatus shall, if so directed in writing by an officer, prominently display a warning notice or sign described in subsection (1) so that the notice or sign is readily seen by any occupational worker or member of the public who may be exposed to radiation from the equipment or apparatus.

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(3) No person shall display or cause to be displayed any symbol illustrated in Figures 1 to 6 in any manner that implies that a radiation hazard exists where this is not the case.

26 Feb 93 cR-1.1 Reg 1 s56.

**PART V
General****Furnishing statements, etc., to department**

57 Where, pursuant to any provision of the Act or these regulations:

- (a) a statement, notice or other document is to be furnished or given to the department; or
- (b) a fee is payable to the department;

the statement, notice or document is to be given or the fee paid, as the case may be, to the Radiation Safety Unit.

26 Feb 93 cR-1.1 Reg 1 s57.

Registration fees

58 The owner of any radiation equipment for which a statement pursuant to section 4 or 8 of the Act is required to be furnished to the department shall pay to the department an annual registration fee set out in Table 6.

26 Feb 93 cR-1.1 Reg 1 s58.

Fees for leak test analysis

59 The fee payable to the department for carrying out a leak test analysis of sealed radioactive sources is \$40 for one to four wipes and \$10 for each additional wipe.

26 Feb 93 cR-1.1 Reg 1 s59.

Fees for radon measurement

60 The fee payable to the department for carrying out a radon gas measurement on request is \$25 for each measurement.

26 Feb 93 cR-1.1 Reg 1 s60.

Calibration fees

61 The fee payable to the department for carrying out the calibration of radiation monitoring equipment or a radiation monitoring device is the fee set out in Table 7.

26 Feb 93 cR-1.1 Reg 1 s61.

Fees for consulting services

62(1) No fee is payable for consulting services unless an officer specifies in writing before the services are provided that a fee is required to be paid.

(2) Where a fee is required to be paid for consulting services, the fee payable to the department for services provided pursuant to clause 17(a) of the Act is \$50 per hour or any portion of an hour, plus travel, accommodation and sustenance expenses calculated in accordance with the amounts approved from time to time for employees in the classified division of the public service of Saskatchewan.

26 Feb 93 cR-1.1 Reg 1 s62.

Inspection fees

63 The department may charge the owner of radiation equipment or associated apparatus or a radiation installation an inspection fee of \$50 per hour or any portion of an hour, plus travel, accommodation and sustenance expenses calculated in accordance with the amounts approved from time to time for employees in the classified division of the public service of Saskatchewan, for:

- (a) each inspection of corrective work required pursuant to clause 16(5)(a) of the Act;
- (b) each visit requested by the owner that is made by an officer to inspect a radiation installation or radiation equipment; and
- (c) each inspection or investigative visit, including any time spent in correspondence or communication, that:
 - (i) is related to:
 - (A) the overexposure of any person to radiation from radiation equipment, associated apparatus or a radiation installation of the owner; or
 - (B) the malfunction of any radiation equipment, associated apparatus or a radiation installation of the owner; or
 - (ii) is made because the owner failed to supply a statement that is required by section 4 or 8 of the Act.

26 Feb 93 cR-1.1 Reg 1 s63.

Examination fees

64 Where a person sits an examination superintended by the Radiation Safety Unit, the person shall pay to the department:

- (a) the examination sitting fee set by the examining body; or
- (b) if no fee has been set by the examining body, \$25 for each paper attempted.

26 Feb 93 cR-1.1 Reg 1 s64.

Appendix**PART I****Tables**

TABLE 1

[Clause 2(1)(i)]

Radiation Weighting Factors

<i>Type and energy range</i>	<i>Radiation weighting factor, w_R</i>
Photons, all energies (x-rays, gamma rays)	1
Electron and muons, all energies (beta rays)	1
Neutrons, energy	
< 10 keV	5
10 keV to 100 keV	10
> 100 keV to 2 MeV	20
> 2 MeV to 20 MeV	10
> 20 MeV	5
Protons, other than recoil protons, energy > 2 MeV	5
Alpha particles, fission fragments, heavy nuclei	20

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TABLE 2

[Clause 5(4)(b)]

Determining weighted dose equivalent

<i>Tissue</i>	<i>Weighting Factor</i>
Gonads	0.20
Bone marrow (red)	0.12
Colon	0.12
Lung	0.12
Stomach	0.12
Bladder	0.05
Breast	0.05
Liver	0.05
Oesophagus	0.05
Thyroid	0.05
Skin	0.01
Bone Surface	0.01
Remainder ¹	0.05 ²

¹For purposes of calculation, the remainder is composed of the following additional tissues and organs: adrenals, brain, upper large intestine, small intestine, kidney, muscle, pancreas, spleen, thymus and uterus.

²In those exceptional cases in which a single one of the remainder tissues or organs receives an equivalent dose in excess of the highest dose in any of the 12 organs for which a weighting factor is specified, a weighting factor of 0.025 should be applied to that tissue or organ and a weighting factor of 0.025 should be applied to the average dose in the rest of the remainder as defined above.

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TABLE 3
[Clause 21(1)(a), subsections 21(3) and 22(1) and (2)]

Exposure Limits for Ultraviolet Radiation

<i>Wavelength nm</i>	<i>Permissible 8 hour radiant exposures J/m²</i>	<i>Relative Spectral Effectiveness, S_λ</i>
180	2,500	0.012
190	1,600	0.019
200	1,000	0.03
210	400	0.075
220	250	0.12
230	160	0.19
240	100	0.30
250	70	0.43
254	60	0.50
260	46	0.65
270	30	1.00
280	34	0.88
290	47	0.64
300	100	0.30
305	500	0.06
310	2,000	0.015
315	10,000	0.003

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TABLE 4
[Subsection 41(2), clauses 41(3)(a) and(b)]

Exposure Limits for Laser Light Shows

<i>Time Interval (t) (seconds)</i>	<i>Maximum Exposure</i>
$< 1.8 \times 10^{-5}$	$5.0 \times 10^{-7} \text{ J/cm}^2$
$\geq 1.8 \times 10^{-5}$ and ≤ 10	$1.8 \times 10^{-3} t^{3/4} \text{ J/cm}^2$
> 10 and $\leq 10^4$	10^{-2} J/cm^2
$> 10^4$	10^{-6} W/cm^2

t = any time between the limits specified

J = joule

W = watt

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TABLE 5
[Section 51]

Exposure Limits for Radio Frequencies in the Range 10 kHz to 1,500 MHz

<i>Frequency Range (MHz)</i>	<i>Power Density (W/m²)</i>	<i>Electric Field Intensity (V/m)</i>	<i>Magnetic Field Intensity (A/m)</i>
0.01 to 1	-	600	4.9
1 to 10	-	600/f	4.9/f
10 to 30	-	60	4.9/f
30 to 300	10	60	0.163
300 to 1,500	f/30	$3.46f^{1/2}$	$0.0093f^{1/2}$

f = frequency of source expressed in MHz

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TABLE 6
[Section 58]

Annual Registration Fee For Radiation Equipment

<i>Type of Equipment</i>	<i>First X-Ray Unit</i>	<i>Each Additional X-Ray Unit</i>	<i>Each Ultrasound Unit</i>	<i>Maximum Total Fee</i>
Medical	\$100	\$50	\$50	\$1,000
Dental	50	30	--	200
Veterinary	50	30	--	200
Industrial	50	30	--	400
Educational	50	30	--	200

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TABLE 7
[Section 61]

Instrument Calibration Fees

<i>Type of Instrument</i>	<i>Fee</i>
Gamma monitor	\$100 plus \$50 for each additional energy calibration point
X-ray monitor	100 plus \$50 for each additional energy calibration point
Microwave oven monitor	40
Radon monitor	150
Surface contamination monitor	100 for each isotope calibration

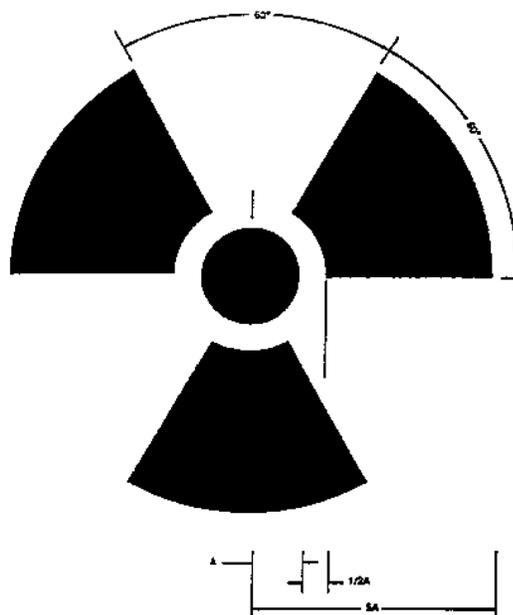
26 Feb 93 cR-1.1 Reg 1.

PART II
Figures

FIGURE 1

[Clause 19(b), subclause 20(1)(b)(iii) and subsection 56(3)]

Radiation Hazard Symbol



A = Radius of the central disc
Note: Construction lines do not appear in the actual symbol

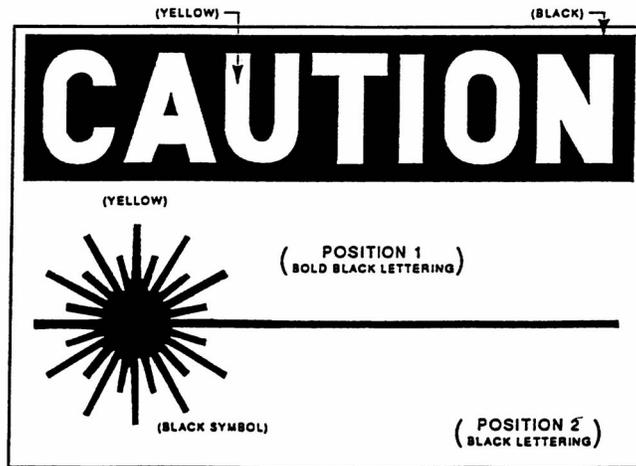
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FIGURE 2
[Clause 28(a) and subsection 56(3)]
Electro-optical Radiation Warning Symbol



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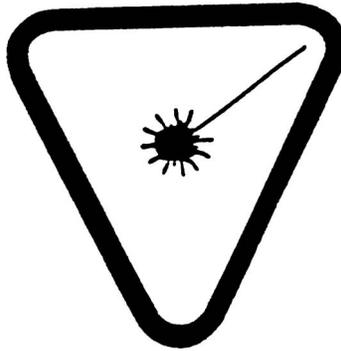
FIGURE 3
[Subsections 29(3), (4), (5) and (6) and 56(3)]
Explanatory Label for Class I, II or IIIA Lasers



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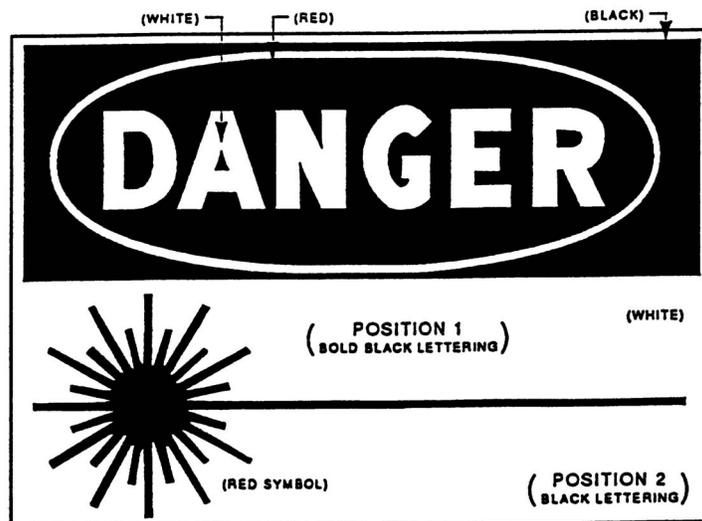
FIGURE 4
[Subsections 29(5) to (8), 34(1) and (2), 38(1), (2) and (4) and 56(3)]

Laser Hazard Symbol



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FIGURE 5
[Clauses 29(7)(b) and (8)(b) and subsection 56(3)]
Explanatory Label for Class IIIB or IV Lasers



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FIGURE 6
[Subsections 47(3), 50(2) and 56(3)]
Microwave Warning Symbol



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PART III

Forms

FORM A

[Subsections 40(1) and (2)]

REGISTRATION OF LASER LIGHT SHOW INSTALLATION

General Information

Name of Owner: _____

Address: _____ Telephone No. _____

Location of Laser Installation: _____

Person in Charge: _____

Names of Operators: _____

_____**Equipment Information**

Manufacturer: _____ Model No. _____ S/N _____

Type: Gas _____ Solid State _____ Other (specify) _____

Emission: Wavelength _____ Others _____

Beam Diameter (cm) _____ Beam Divergence (rad or degress) _____

Operation: Continuous Wave _____ Pulsed _____

Rating: Power (watts) _____ Energy (joules) _____

Power Density (W/m^2) _____ Energy Density (J/m^2) _____

Pulse Duration (second) _____

Pulse Repetition Frequency _____

Date: _____ Signature _____

Position _____

Complete and return this form to Radiation Safety Unit, 1870 Albert Street, Regina, Saskatchewan, S4P 3V7

FORM B
[Clauses 42(a) and (b)]

REGISTRATION OF MEDICAL ULTRASOUND EQUIPMENT

General Information	
Name of Owner: _____	
Address: _____ Telephone No. _____ _____	
Location of Ultrasound Unit: _____	
Person in Charge: _____	
Equipment Information	
Manufacturer: _____	
Control Model No. _____	S/N _____ Year New _____
Transducer #1: Model No. _____	S/N _____ Year New _____
Area (cm ²) _____	Frequency (Hz) _____
Transducer #2: Model No. _____	S/N _____ Year New _____
Area (cm ²) _____	Frequency (Hz) _____
Transducer #3: Model No. _____	S/N _____ Year New _____
Area (cm ²) _____	Frequency (Hz) _____
**if you have additional transducers, please list them on the back of this form	
Operation: Continuous Wave _____	Pulsed _____
Rating: Power (watts) _____	Energy (joules) _____
Power Density (W/m ²) _____	Energy Density (J/m ²) _____
Pulse Duration (second) _____	
Pulse Repetition Frequency _____	
Equipment Use	
Diagnostic _____	Therapeutic _____
Date: _____	Signature _____
	Position _____

Complete and return this form to Radiation Safety Unit, 1870 Albert Street, Regina, Saskatchewan, S4P 3V7

26 Feb 93 cR-1.1 Reg 1.