HEALTH

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RADIATION SAFETY ACT 1975

RADIATION SAFETY (GENERAL) AMENDMENT REGULATIONS (No. 2) 1994

Made by His Excellency the Governor in Executive Council.

Citation

1. These regulations may be cited as the *Radiation Safety (General) Amendment Regulations (No. 2) 1994*.

Principal regulations

2. In these regulations the *Radiation Safety (General) Regulations 1983** are referred to as the principal regulations.

[**Published in Gazette of 21 February 1983 at pp. 556-636. For amendments to 31 January 1994 see 1992 Index to Legislation of Western Australia, Table 4, p. 216, and Gazette of 4 and 28 May, 11 June and 9 July 1993 and 28 January 1994.*]

Regulation 7A amended

3. Regulation 7A of the principal regulations is amended—

(a) in subregulation (1) by inserting after "Schedule VIIA" the following—

" , or that is contained in a gaseous tritium light device used in an aircraft, ";

(b) in subregulation (2) by deleting "The" and substituting the following—

" Subject to subregulation (3), the "; and

(c) by inserting after subregulation (2) the following subregulation—

" (3) Subregulation (2) (b) and (c) do not apply to a gaseous tritium light device used in an aircraft. ".

Regulation 28 amended

4. Regulation 28 of the principal regulations is amended in subregulation (3)—

(a) by deleting the fullstop after paragraph (c) and substituting the following—

" ; and "; and

(b) by inserting after paragraph (c) the following paragraph—

" (d) in the case of premises where cobalt telegraphy equipment is present, that the equipment is installed and used in accordance with the requirements set out in Schedule XVI. ".

Schedule I amended

5. Schedule I to the principal regulations is amended in item 1 (1) (f) by deleting "25 (7)" and substituting the following—

" 25 (3) (a) ".

Schedule XVI added

6. After Schedule XV to the principal regulations the following Schedule is added—

"

SCHEDULE XVI

[Regulation 28 (3) (d)]

1. In the Schedule—

"equipment" means cobalt telegraphy equipment;

"treatment room" means a room where the radiation source for any equipment is housed.

2. (1) The treatment room shall have approved structural shielding so that the dose equivalent limit any person (other than a patient receiving treatment) is exposed to does not exceed the limits prescribed by Schedule I.

(2) The structural shielding referred to in subitem (1) shall be—

(a) approved by the Council and qualified expert before the construction of the treatment room; and

(b) reviewed by a qualified expert before any structural alteration to the treatment room or any modification to the equipment.

3. A radiation survey shall be carried out by a qualified expert to ensure that the shielding referred to in item 2 (1) is as approved—

(a) immediately after the equipment is installed and before any patient is treated; and

(b) immediately after any structural alteration to the treatment room or any modification to the equipment.

4. The entrance to the treatment room shall be clearly and permanently labelled with a sign of not less than 15 cm x 15 cm stating "CAUTION—RADIATION" and containing the radiation warning symbol.

5. It shall be possible from outside the treatment room, to observe and converse with a patient who is inside the treatment room.

6. When the radiation beam is in use, a signal shall indicate this clearly to persons inside the treatment room and persons about to enter the treatment room.

7. The radiation source shall be fitted with a source control mechanism so that—

(a) if any door or other barrier (such as a light beam) to the treatment room is opened or interrupted, the equipment shall automatically and immediately switch off;

(b) the equipment cannot be activated until all barriers to the treatment room are closed; and

(c) after the equipment has switched off, as referred to in paragraph (a), it can only be reactivated manually.

8. Only the person receiving treatment shall be in the treatment room while the radiation beam is in use.

9. No person shall enter the treatment room other than as necessary for treatment, for operation or maintenance of the equipment or for other essential activities.

10. A qualified expert shall—

(a) be responsible for ensuring the correct operation and calibration of the equipment in accordance with the "Revised code of practice for dosimetry of 2 to 25 MV x-rays, and of caesium-137 and cobalt-60 gamma ray beams" (Physics in Medicine and Biology 1983 Vol. 28, No. 10, pp. 1097-1104) or other approved international protocol; and

(b) verify radiation field sizes relevant to radiation beam data at intervals not exceeding 4 weeks.

11. Emergency procedures to be followed in the event of the failure of the source control mechanism shall be established, approved and posted at the treatment control panel.

12. It shall be possible to lock mechanically the source control mechanism in the "safe" position during maintenance.

13. (1) A permanent radiation monitor shall be installed in the treatment room for continuous monitoring of the radiation beam status.

(2) The permanent radiation monitor shall provide a visual signal—

(a) inside the treatment room; and

(b) near the entrance outside the treatment room.

(3) The permanent radiation monitor shall have the capacity to provide an audible signal inside the treatment room and this signal shall be used when maintenance or calibration of the equipment is in progress.

14. A permanent radiation monitor used in association with the equipment shall—

(a) provide visible warning of a malfunction that may result in an exposed or partly exposed radiation source;

(b) provide a warning of high radiation levels which is visible to a person in, or about to enter, the treatment room;

(c) have an emergency power supply (i.e. a battery system) which is separate from the power supply to the equipment; and

(d) be tested to ensure that it is operating correctly each day before the equipment is used for treatment.

15. (1) A portable radiation survey monitor shall be available on the premises where the treatment room is located and shall be used if any malfunction occurs that may result in an exposed or partly exposed radiation source.

(2) The portable radiation survey monitor referred to in subitem (1) shall be calibrated by an approved calibration facility at intervals not exceeding 12 months.

16. The equipment shall be inspected and serviced by an approved person to ensure that the radiation source control mechanism is functioning properly—

(a) during replacement of the radiation source; and

(b) at intervals not exceeding 3 months.

17. The protective source housing for the equipment shall be—

(a) constructed so that, measured in accordance with item 18—

(i) when the radiation beam is off, the maximum dose rate in air at one metre from the radiation source does not exceed 0.1 milliGray per hour and the average dose rate in air does not exceed 0.02 milliGray per hour; and

(ii) when the radiation beam is on, the maximum dose rate in air at one metre from the radiation source does not exceed 0.1% of the useful beam exposure rate at one metre or 10 milliGray per hour, whichever is the greater;

and

(b) such that the integrity of the protective source housing shielding is preserved in the event of fire.

18. (1) When the radiation beam is off, the maximum dose rate in air shall be measured at 26 points defined by a sphere one metre in radius centred on the radiation source of which—

(a) 2 points shall be located at the Poles of the sphere and 4 equally spaced points shall be located on the sphere's equator;

(b) 8 points shall be located at the centres of the spherical triangles formed by connecting the first 6 points; and

(c) 12 points shall be located at points midway between the first 6 points.

(2) The average maximum dose rate of the 26 points referred to in subitem (1) shall not exceed 0.02 milliGray per hour and no point shall exceed 0.1 milliGray per hour.

(3) When the radiation beam is on, the maximum dose rate in air shall be measured with the beam defining diaphragms closed as far as possible and, if the useful beam aperture is not completely intercepted at that position, the entire useful beam shall be blocked by lead which has an attenuation equivalent to that of the equipment source housing.

19. (1) The radiation source housing, including the radiation beam aperture and other locations likely to be contaminated in the event of a leakage, shall be tested when the radiation beam is off for leakage of radioactive material—

(a) immediately after the installation of the equipment;

(b) at intervals not exceeding 12 months; and

(c) immediately before any maintenance work is carried out in the housing port or collimator assembly.

(2) No maintenance work shall be carried out in the housing port or collimator assembly until the contamination test described in subitem (1) is completed.

20. If the contamination test described in item 19 (1) indicates the presence of free activity of more than 2 000 Bq, the radiation source shall be considered to be leaking and—

(a) arrangements shall be made for immediate repair to be carried out; and

(b) the Council shall be notified in writing immediately.

21. Beam collimation shall be carried out using permanent cones or diaphragms which—

(a) do not transmit more than 2% of the useful beam; and

(b) comply with the leakage radiation limits set out in item 17 (a).

22. Where a diaphragm is used for beam collimation—

(a) the diaphragm shall include a light beam providing illumination of not less than 100 lux at a distance of one metre from the light source; or

(b) the treatment area shall be indicated by a laser alignment system.

23. When the radiation source is in the "on" position and at the usual treatment distance (i.e. source to skin distance or source to isocentre distance), the mechanical axis defining the axis of rotation of the collimating device shall be accurately aligned to within 2 mm of the central axis of the radiation beam for all orientations of the treatment head.

24. The equipment shall have a remotely operated source control mechanism which—

(a) can function in any orientation of the source housing;

(b) automatically and immediately switches the equipment off—

(i) at the predetermined end of the exposure; or

(ii) if there is a breakdown or interruption of the activating force;

and

(c) ensures that the equipment remains switched off, as referred to in paragraph (b), until it is reactivated manually.

25. (1) The equipment and source control mechanism shall be located so that in an emergency the equipment can be turned off with the minimum possible exposure to any person.

(2) Any tools required for turning the equipment off manually shall be mounted in a position near the treatment room entrance that is easily visible and accessible.

26. The source housing and the treatment control panel shall each have a warning device that plainly indicates whether the radiation beam is "on" or "off" and whether the source or shutter is "in transit".

27. (1) The equipment shall have—

(a) an automatic timer, or an integrated dosemeter, which terminates the treatment after a pre-set time or dose; and

(b) a back-up timer which is independent of the timer referred to in paragraph (a).

(2) The timers referred to in subitem (1) shall be arranged so that—

(a) the failure of one timer does not affect the other timer;

(b) the possibility of accidental communication between the timers is minimized;

(c) each timer is capable of terminating the radiation exposure by means independent of the other timer;

(d) the terminating electrical circuits of the 2 timers are kept physically separate;

(e) each timer counts up from zero so that an over-exposure will give a reading;

(f) information from the timers is retrievable, including after a power failure;

(g) the stopping and starting of the timers is controlled by switches activated by the source or shutter so that in the event of failure of the terminating means, a true record of maximum exposure time is obtained;

(h) the switch controlling the timer referred to in subitem (1) (a) shall operate when the source or shutter—

(i) arrives at; and

(ii) leaves,

the fully "on" position;

(i) the switch controlling the back-up timer referred to in subitem (1) (b) shall operate when the source or shutter—

(i) arrives at; and

(ii) leaves,

a position where the source is just shielded; and

(j) the back-up timer referred to in subitem (1) (b) shall terminate the radiation exposure at a time not more than 6 seconds after the termination time for the treatment pre-set on the timer referred to in subitem (1) (a).

(3) The electrical circuits of the equipment shall be arranged so that—

(a) after each radiation exposure, the tripping mechanism of the back-up timer referred to in subitem (1) (b) must be manually checked and the settings and readings of both timers must be manually returned to zero; and

(b) it is not possible to set or commence radiation exposure until the sequence referred to in paragraph (a) has been completed.

(4) If treatment is terminated by an event other than the operation of the timer referred to in subitem (1) (a), the equipment shall give or show a signal which clearly indicates this.

28. (1) It shall be impossible for the source control mechanism to be switched on from inside the treatment room.

(2) The source control mechanism shall have a locking device so that it cannot be operated by any unauthorized person.

29. (1) The equipment shall be arranged so that the selection of the mode of treatment and the selection and correct location of wedge filters are identified electrically.

(2) Radiation exposure shall be impossible until the selection made in the treatment room of the mode of treatment and wedge filter has been manually verified at the treatment control panel.

(3) After the verification referred to in subitem (2), the selected mode of treatment and wedge filter shall be displayed on the treatment control panel.

30. (1) A beam stop or counterweight, on the equipment shall not transmit more than 0.1% of the useful beam.

(2) The equipment shall be arranged so that—

(a) the relationship between the useful beam and a beam stop is permanently fixed; or

(b) it has mechanical or electrical stops to ensure that the beam is directed only towards barriers for which useful beam shielding has been provided. ".

By His Excellency's Command,

D. G. BLIGHT, Clerk of Council.