

1969. No. 318

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FACTORIES

The Ionising Radiations (Sealed Sources) Regulations
(Northern Ireland) 1969

REGULATIONS, DATED 26TH NOVEMBER 1969, MADE BY THE MINISTRY OF HEALTH AND SOCIAL SERVICES UNDER THE FACTORIES ACT (NORTHERN IRELAND) 1965.

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REGULATIONS

The Ministry of Health and Social Services for Northern Ireland in exercise of powers conferred by sections 75 and 179(3) and Schedule 4 of the Factories Act (Northern Ireland) 1965(a), and of all other powers enabling it in that behalf, hereby makes the following special Regulations:—

PART I

INTERPRETATION AND GENERAL

Citation, commencement and revocation

1.—(1) These Regulations may be cited as the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1969. Regulations 32, 46 and 47 shall come into operation on 21st May 1970 and the remainder of these Regulations on 27th December 1969.

(2) The Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962(b) are hereby revoked.

Interpretation

2. In these Regulations—

“adequate shielding” means shielding or a demarcating barrier outside which the radiation dose rate averaged over any one minute does not exceed 0.75 millirems per hour or where only classified workers are affected 2.5 millirems per hour, and cognate expressions shall be construed accordingly;

“appointed doctor” means—

- (a) (i) as respects any factory to which Regulation 3(2) applies;
- (ii) for the purposes of implementing any arrangements made thereunder with employers of classified workers, as respects any factory to which Regulation 3(3) applies; and
- (iii) for the purposes of any medical examination in pursuance of Regulation 25(1)(a),

any fully registered medical practitioner appointed to be a factory doctor for any of the purposes of the Act; and

- (b) as respects any other factory and any other medical examination, a fully registered medical practitioner specially appointed under section 151 of the Act to be appointed factory doctor for the factory for the purposes of these Regulations or of the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962 or the appointed factory doctor for the district in which the factory is situated;

“approved” means approved for the time being for the purposes of these Regulations or of the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962 by certificate of the Chief Inspector;

“atomic energy” means the energy released from atomic nuclei as the result of any process, including the fission process, but does not include energy released in any process of natural transmutation or radioactive decay which is not accelerated or influenced by external means;

“authorised person” in any of these Regulations means a person for the time being authorised in writing by the occupier for the purposes of that Regulation;

“calendar quarter” means the period of three calendar months beginning with 1st January, 1st April, 1st July or 1st October;

“classified worker” has the meaning assigned to it by Regulation 16(1);

“competent person” means a person appointed in pursuance of Regulation 7;

“factory” means any factory and any premises, places, processes, operations and works to which the provisions of Part IV of the Act with respect to special regulations for safety and health are applied by any of the following provisions of that Act, namely, section 121 (which relates to electrical stations), section 122 (which relates to institutions), so much of section 123 as relates to warehouses other than warehouses belonging to the owners, trustees or conservators of any dock, wharf or quay, section 124 (which relates to ships) and section 125 (which relates to building operations and works of engineering construction);

“health register” means the register referred to in Regulation 31;

“ionising radiations” means electromagnetic radiation (that is to say, X-rays and gamma rays) or corpuscular radiation (that is to say, alpha particles, beta particles, electrons, positrons, protons, neutrons, or heavy particles) being electromagnetic radiation or corpuscular radiation capable of

- producing ions and emitted from a radioactive substance or from a machine or apparatus that is intended to produce ionising radiations or from a machine or apparatus in which charged particles are accelerated by a voltage of not less than five kilovolts;
- “monitoring” means measuring in accordance with Regulation 39 and “monitor” shall be construed accordingly;
- “nuclear reactor” means any plant (including any machinery, equipment or appliance, whether affixed to land or not) designed or adapted for the production of atomic energy by a fission process in which a controlled chain reaction can be maintained without an additional source of neutrons;
- “the Act” means the Factories Act (Northern Ireland) 1965;
- “protected employment” means employment as respects which requirements are for the time being imposed under the Act (including the requirements of these Regulations) for recording the radiation doses received by the persons employed;
- “radiation area” means a part of a factory in which any person is exposed to a radiation dose rate which when averaged over any one minute exceeds or is liable to exceed 0.75 millirems per hour, otherwise than infrequently and transiently;
- “radiation dose record” means the record referred to in Regulation 19(1);
- “radioactive substance” means any substance which consists of or contains radionuclides, whether natural or artificial, and of which the activity exceeds 0.002 of a microcurie per gramme of substance; in the case of a chain of radionuclides, consisting of a parent and daughters, the only nuclide to be taken into consideration being that having the highest activity of those present;
- “sealed source” means any radioactive substance sealed in a container (otherwise than solely for the purpose of storage, transport or disposal) or bonded wholly within material and includes the immediate container or the bonding, but does not include any nuclear fuel element or any radioactive substance inside a nuclear reactor;
- “transfer record” means a record prepared on the termination of any person’s employment of radiation doses received by him being a record prepared in accordance with requirements for the time being imposed under the Act (including the requirements of these Regulations);
- “useful beam” means, in the case of X-rays, that part of the radiation from an X-ray tube that passes through the aperture, cone or other device for collimating the X-ray beam; and, in other cases, any ionising radiations from a sealed source that can be employed for the purposes for which the sealed source is used.

Application of Regulations

3.—(1) Except as provided in paragraphs (4) and (5), these Regulations shall apply to all factories in which any sealed source is, or is proposed to be, stored, manipulated, maintained, operated, used or installed, or in which there is operated or used, or proposed to be operated or used, any machine or apparatus that is intended to produce ionising radiations or any machine or apparatus (being a machine or apparatus which emits ionising radiations) in which charged particles are accelerated by a voltage of not less than five kilovolts.

(2) Where in any factory the occupier is neither the owner nor the hirer of a sealed source or of such a machine or apparatus as is referred to in para-

graph (1) being a sealed source, machine or apparatus which is used by or under the direction of some person other than the occupier or a person in the employment of the occupier, that other person or (if he is in the employment of the owner or hirer) the employer of that other person, shall in relation to that sealed source, machine or apparatus be deemed to be the occupier of the factory for the purposes of these Regulations.

(3) Where in any factory (other than a factory to which paragraph (2) applies) any classified worker is employed by some person other than the occupier, the occupier shall be deemed to have complied in respect of any such worker so employed with any requirement imposed on him by Part IV or Part V, if he has made effective arrangements which secure that the employer of the worker complies as respects that worker with that requirement as if the employer were the occupier.

(4) Nothing in these Regulations shall apply with respect to any apparatus exclusively used in a room specially set apart for the purpose, for the prevention, diagnosis or treatment of illness or injury.

(5) Nothing in these Regulations shall apply with respect to—

(a) any sealed source at or near the surface of which the dose rate of ionising radiations does not exceed ten millirems per hour not being one of a number of sealed sources placed together and whose collective dose rate at or near the surface exceeds ten millirems per hour; or

(b) any ionising radiations that do not arise from a sealed source or from such a machine or apparatus as is referred to in paragraph (1); or

(c) any installation of a class or description which is on the date of the making of these Regulations prescribed for the purposes of section 1(1)(b) of the Nuclear Installations Act 1965(c), and situate on a site in respect of which a nuclear site licence granted under the Act is in force; or

(d) any apparatus intended only for the purpose of receiving visual images sent by television—

(i) when operated at a voltage of not more than 20 kilovolts in the course of its manufacture, repair, maintenance or testing; or

(ii) in any other circumstances, when the dose rate at or near the surface of the apparatus does not exceed 0.5 millirems per hour.

In sub-paragraph (a) and (d) the expression “at or near the surface” means as near the surface as is practicable for the purpose of measuring the dose rate of ionising radiations.

(6) The provisions of these Regulations shall be in addition to and not in substitution for or in diminution of other requirements imposed by or under the Act.

Exemption certificates

4. The Chief Inspector may (subject to such conditions as may be specified therein) by certificate in writing (which he may in his discretion revoke at any time) exempt from all or any of the requirements of these Regulations—

(a) any factory or part of any factory; or

(b) any class or description of factories or parts thereof; or

(c) any machine, plant, apparatus, process, article or substance or any class or description of machines, plant, apparatus, processes, articles or substances; or

(d) the employment of any person or any class or description of persons, if he is satisfied that the requirements in respect of which the exemption is granted are not necessary for the protection of persons employed. Where such exemption is granted a legible copy of the certificate, showing the conditions (if any) subject to which it has been granted, shall be kept posted in any factory where the exemption applies in a position where it may be conveniently read by the persons employed.

PART II

ADMINISTRATION, NOTIFICATIONS AND RECORDS

Notification of use and disuse of sealed sources, etc.

5.—(1) The occupier shall give previous notice in writing to the Chief Inspector (which, except in cases of emergency, shall be not less than one month's notice or such shorter notice as the Chief Inspector may agree to accept) before undertaking in a factory for the first time after the date of commencement of these Regulations or for the first time after a notice under paragraph (2) given in respect of the factory has expired, work to which this Regulation applies:

Provided that an occupier who is at the date of the commencement of these Regulations undertaking work to which this Regulation applies (or who would at that date but for a merely temporary cessation be undertaking such work) shall not be required under this paragraph to give notice to the Chief Inspector in respect of that work if notice has been given in respect of it under Regulation 6(1) or (2) of the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962.

(2) The occupier shall either before or within seven days after ceasing to use the factory (otherwise than merely temporarily) for work to which this Regulation applies give notice in writing to that effect to the Chief Inspector.

(3) In this Regulation the expression "work to which this Regulation applies" means work involving the storage, manipulation, maintenance, operation, use or installation of sealed sources or the operation or use of any machine or apparatus of the kind referred to in Regulation 3(1).

Notification of accidents, etc.

6. The Chief Inspector shall be notified in writing—

- (a) in the circumstances specified in Regulation 36, if any sealed source is lost or mislaid; and
- (b) as soon as possible after it is discovered—
 - (i) of any breakage of the immediate container or the bonding of a sealed source; and
 - (ii) of any leakage of any radioactive substance beyond the approved extent from the immediate container or the bonding of a sealed source.

Appointment of a competent person

7.—(1) The occupier shall appoint one or more competent persons to exercise special supervision with regard to the requirements of these Regulations and to assist in enforcing the observance of them.

(2) The name or names of the competent person or competent persons shall be kept posted in the factory where it or they can be conveniently read by the persons employed. Where different persons are appointed for different parts of the factory or for different processes the names shall be posted in such a manner that the persons employed can readily identify the competent person or competent persons appointed for the part of the factory or for the processes in which they are employed.

(3) Where in any factory more than one competent person is appointed, any reference in these Regulations to the competent person shall be deemed to include a reference to any one of those persons or, as the case may be, to the person appointed, or to any one of the persons appointed, for the part of the factory or for the processes concerned.

Notifications to the competent person

8. The competent person appointed in accordance with Regulation 7 shall be informed of every matter which is required to be notified to the Chief Inspector under Regulation 6.

Investigations by the competent person

9. In addition to his other duties, the competent person appointed in accordance with Regulation 7 shall investigate the circumstances of every occurrence notified to him under Regulation 8 and report thereon to the occupier with a recommendation as to the action to be taken.

Preservation of records

10. Every register, certificate or record kept in pursuance of these Regulations or of the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962 and every transfer record and copy transfer record received by an employer in pursuance of Regulation 22 or of Regulation 31 of the Regulations of 1962 shall be preserved in the factory or in such place outside the factory as may be approved and kept available for inspection by any inspector or by the appointed doctor for at least the following periods after the last entry therein, that is to say, thirty years in the cases of the health register, the radiation dose records, the transfer records and the copy transfer records, three years in the case of the register kept in pursuance of Regulation 34(5) or of Regulation 15(5) of the Regulations of 1962 and two years in all other cases: Provided that where a copy of or an extract from or a summary of any such document or documents has been approved, the provisions of this Regulation may be complied with as respects the copy or extract or summary (as the case may be) in place of the document or documents from which the extract, or of which the copy or the summary, has been made.

PART III

BASIC PRINCIPLES OF PROTECTION

Restriction of exposure to ionising radiations

11.—(1) Without prejudice to the other requirements of these Regulations, the occupier shall do all that is reasonably practicable to restrict the extent to which the persons employed are exposed to ionising radiations; and no person employed shall expose himself to ionising radiations to a greater extent than is reasonably necessary for the purposes of his work.

(2) Without prejudice to any approved arrangements under Regulation 15 for the time being in force and applicable to him, no person shall receive any radiation dose in excess of those permitted under the Schedule.

Provision of shielding against ionising radiations

12. Without prejudice to the other requirements as to adequate shielding, all sources of ionising radiations shall, where reasonably practicable, be adequately shielded.

Direction and size of useful beam

13.—(1) Wherever practicable the useful beam shall be directed away from adjacent occupied areas.

(2) The useful beam shall be limited by appropriate means to the minimum size reasonably necessary for the work.

(3) Where appropriate, suitable measures shall be taken to limit scattered radiation.

Instruction of persons employed

14. No person employed shall be exposed to ionising radiations unless he has received appropriate instruction (to the extent that this is necessary having regard to the circumstances of his employment) concerning the hazards involved and the precautions to be observed.

Arrangements for protection of workers

15.—(1) Without prejudice to the other requirements of these Regulations, where the Chief Inspector has reasonable cause to believe as respects any factory that any person employed may have received, or is likely to receive, in any calendar year or in any calendar quarter, as the case may be, a sum of radiation doses greater than three-tenths of the appropriate dose permitted under the Schedule, the Chief Inspector may serve on the occupier a written notice requiring him to make approved arrangements as respects all or any of the following matters—

- (a) for the wearing by any person employed of a photographic film or an appropriate radiation dosimeter, and for the keeping and preserving of records of doses received;
- (b) for the monitoring of any part of the factory, and for the keeping and preserving of records of measurements obtained by such monitoring;
- (c) for determining in the case of any person employed the amount of radioactive substances in his body, for estimating, when practicable, the radiation dose therefrom, and for the keeping and preserving of records of any determination and estimation so made;
- (d) for the suspension of any person from work in which he will be exposed to ionising radiations or for imposing special conditions on his continued employment on any such work;
- (e) for the medical examination of any person employed; and
- (f) for the making of a special entry in the radiation dose record in respect of any person employed.

(2) It shall be the duty of every person employed to comply with the requirements of any such approved arrangements in so far as they require the wearing by him of photographic film or a radiation dosimeter or require him to be medically examined.

PART IV

RADIOLOGICAL SUPERVISION

Classified workers

16.—(1) The following persons shall for the purposes of these Regulations be designated by the occupier as classified workers, that is to say, persons who are employed for any of their time in radiation areas in work involving the storage, manipulation, maintenance, operation, use or installation of sealed sources or the operation or use of any machine or apparatus of the kind referred

to in Regulation 3(1), not being persons employed in accordance with an approved scheme of work within the meaning of paragraph (2), and in these Regulations the expression "classified worker" shall be construed accordingly.

(2) In paragraph (1) "approved scheme of work" means an approved scheme of work as respects which the Chief Inspector is satisfied that the operating and working conditions and the system of control and instruction are such that a person working in accordance with the scheme is not likely to receive in any calendar year a sum of radiation doses exceeding three-tenths of the appropriate dose permitted in any calendar year under the Schedule.

(3) No person under the age of eighteen shall be employed on work which requires him to be designated as a classified worker.

(4) The names of all persons designated as classified workers shall be kept entered in the health register.

Current employment in more than one factory

17. Where any person is or is to be currently employed as a classified worker in more than one factory by the same employer—

- (a) all the factories in which that person is or is to be so currently employed shall in relation to that person be deemed, for the purposes of these Regulations, to constitute one factory;
- (b) except in the cases referred to in paragraph (a) of the definition of the expression "appointed doctor" in Regulation 2(2), references in these Regulations to the appointed doctor shall be construed as references to the appointed doctor for any one of those factories;
- (c) the references to the health register in Regulations 25, 30 and 31, shall be taken as references to the health register for any one of those factories, so, however, that as respects any period only one health register shall be used in respect of that person; and
- (d) the reference in Regulation 28(1) to the factory shall be taken as a reference to any one of those factories.

Film badges and dosimeters

18.—(1) The occupier shall make suitable arrangements for the wearing on an appropriate part or parts of his person by every classified worker of either a suitable photographic film or films in an appropriate holder or holders or a suitable dosimeter or suitable dosimeters, being a dosimeter or dosimeters of an approved type, during any working period in which that worker is liable to be exposed to ionising radiations. It shall be the duty of every classified worker to wear in a proper manner any film or dosimeter provided for him in pursuance of this Regulation, and at intervals specified by the occupier to return every such film or dosimeter to the occupier for the purposes of the examination mentioned in paragraph (2).

(2) The occupier shall obtain the films, film holders and dosimeters from an approved laboratory and arrange for the films and dosimeters, identified by reference to the particular wearer, to be returned at appropriate intervals to that laboratory for examination and for the issue to the occupier, by the director or other responsible person at the laboratory, of certificates containing the approved particulars of the results of the examination of each film and dosimeter.

Radiation dose records

19.—(1) Subject to the provisions of paragraph (2), a radiation dose record shall be kept containing as respects each classified worker the approved

particulars of the maximum radiation doses permitted under the Schedule and of the radiation doses received by him and, as respects any person employed (whether or not he is a classified worker), any special entry required in accordance with Regulation 15 or 21.

(2) Where it appears to an occupier that any person employed or engaged for employment by him as a classified worker, either—

(a) was previously engaged—

(i) in work in a factory being work done before the imposition of requirements under the Act (including these Regulations) for recording the radiation doses received by the persons employed in such work, but which, if, after the date of coming into operation of these Regulations, it had been done by a person employed would have been protected employment; or

(ii) in work not done in a factory but which if, after the date of the coming into operation of these Regulations, it had been done in a factory by a person employed, would have been protected employment; or

(b) at times other than the hours during which he is employed by him is engaged in work of a kind specified in sub-paragraph (a)(ii),

and such person produces to the occupier any document purporting to be a record of radiation doses received by that person whilst performing the work, the occupier shall, so far as practicable, enter in the radiation dose record kept as respects that person, the particulars contained in the document of the radiation doses received by him whilst performing that work.

(3) The radiation dose record as respects any person shall be kept up to date and shall be open to the inspection of that person at all reasonable times.

(4) For the purposes of the radiation dose record, a dose received during any period as indicated by a certificate issued in pursuance of Regulation 18(2) which did not fall wholly within one calendar quarter shall be deemed to have been received at a uniform rate on all the days (whether working days or not) throughout the period.

Excessive exposure of persons employed

20.—(1) Whenever any person has reasonable cause to believe as respects himself (if employed) or any other person employed that he has received any radiation dose in excess of that permitted under the Schedule, he shall report the circumstances to the occupier who shall forthwith make an investigation or arrange for an investigation to be made.

(2) Where any such investigation confirms such a report or the occupier has other reason to believe that any person employed has received a radiation dose in excess of that permitted under the Schedule, the occupier shall forthwith—

(a) notify the appointed doctor;

(b) notify the Chief Inspector; and

(c) keep a record of the circumstances as respects that person.

(3) Whenever it appears from the radiation dose record that any worker has received a radiation dose in excess of that permitted under the Schedule, the occupier shall forthwith—

(a) make an investigation or arrange for an investigation to be made;

(b) notify the appointed doctor; and

(c) notify the Chief Inspector.

Radiation doses greater or less than shown by the film badge or dosimeter

21.—(1) Whenever the occupier has reasonable cause to believe that any person has received during any period during which a film or dosimeter is required to be worn by that person in pursuance of these Regulations a radiation dose which is much greater or much less than the dose indicated by any certificate issued in accordance with these Regulations as respects the films or dosimeters worn by him during that period, the occupier shall make an investigation or arrange for an investigation to be made and where any such investigation confirms his belief, the occupier shall apply to the Chief Inspector for approval of a special entry and such special entry so approved shall be made in that person's radiation dose record.

(2) Whenever the Chief Inspector has reason to believe that any person has received during any period during which a film or dosimeter is required to be worn by that person in pursuance of these Regulations a radiation dose which is much greater or much less than the dose indicated by any certificate issued in accordance with these Regulations as respect the films or dosimeters worn by him during that period, the Chief Inspector may approve a special entry and any such special entry so approved shall be made in that person's radiation dose record.

Transfer records

22.—(1) Where any person as respects whom an employer is or has been required to keep a radiation dose record ceases to be employed by that employer, that employer shall forthwith prepare a transfer record in the approved form and containing the approved particulars. The employer, if he knows the whereabouts of that person, shall forthwith supply him with the transfer record and shall in any case forthwith send a copy of it to the Chief Inspector.

(2) Before any person who was previously in protected employment with another employer is employed, or engaged for employment, as a classified worker, that person shall notify his employer or, as the case may be, prospective employer, of the previous protected employment; and shall, if he has received from his employer in that previous employment a transfer record and that record is still in his possession, produce it to his employer or, as the case may be, prospective employer, and make it available to the appointed doctor. In the event of that person being employed, or engaged for employment, as a classified worker the transfer record shall be handed to and retained by the employer.

(3) When the occupier is aware that any person employed, or engaged for employment, as a classified worker was previously in protected employment with another employer and that person does not produce a transfer record in pursuance of paragraph (2), the occupier shall forthwith apply to the Chief Inspector for a copy of that record.

PART V**MEDICAL SUPERVISION***Arrangements for supervision*

23. The occupier shall make arrangements for medical supervision by the appointed doctor of all classified workers, including specific arrangements as provided in this Part.

Facilities for appointed doctor

24.—(1) For the purpose of examinations conducted at a factory to which these Regulations apply, the occupier shall provide for the exclusive use of the

appointed doctor on the occasion of the examination a room properly cleaned and adequately warmed and lighted and furnished with a screen, a table with writing materials, chairs, an examination couch and a wash basin with a supply of clean, running hot and cold or warm water.

(2) The occupier shall afford to the appointed doctor adequate facilities for inspecting any process, operation or work in which a person having been, being or to be examined by the appointed doctor has been, is or is proposed to be, employed.

Medical examination of persons before employment as classified workers

25.—(1) No person shall be employed in a factory as a classified worker unless—

- (a) within the period of fourteen months immediately preceding his first employment in that factory, he has been examined by an appointed doctor and, by signed entry by the doctor in the health register, certified fit for employment as a classified worker; and
- (b) he has at any time undergone a suitable blood examination, an adequate report of the results of which is available and known to the doctor.

(2) In this Regulation, the expression “first employment in that factory” means first employment in that factory as a classified worker or re-employment in that factory as a classified worker following any cessation of employment as a classified worker in that factory for a period exceeding fourteen months.

Periodic medical examination of persons employed

26. The occupier shall arrange for medical examinations by the appointed doctor of every worker who is a classified worker once in every calendar year so long as his employment as a classified worker continues, if it appears from his radiation dose record that during the immediately preceding calendar year he has received a sum of radiation doses which is greater than three-tenths of the appropriate doses permitted in any calendar year under the Schedule.

Special medical examination of persons employed

27. Where the occupier has notified the appointed doctor in accordance with Regulation 20 that any person employed has received a radiation dose in excess of that permitted under the Schedule, the occupier shall arrange for the person concerned to undergo without delay a medical examination by the appointed doctor in any case where the excessive radiation dose either—

- (a) exceeds 10 rems in the case of a dose to parts of the body other than the hands, forearms, feet and ankles from all or any one or more of the following, that is to say, X-rays, gamma rays and neutrons; or
- (b) in any other case exceeds the doses permitted under the Schedule.

Place of medical examinations and duty of persons concerned

28.—(1) Except where otherwise authorised or directed in writing by the Chief Inspector, any medical examination by the appointed doctor (being an appointed doctor appointed by virtue of paragraph (b) of the definition of the expression “appointed doctor” in Regulation 2) for the purposes of these Regulations shall take place at the factory.

(2) Due notice of every medical examination for the purposes of these Regulations shall be given by the occupier to those concerned and it shall be the duty of the persons employed as classified workers to submit themselves for examination by the appointed doctor in accordance with these Regulations as required by such notice and for any special examination required under Regulation 29(1) and to submit to the taking of samples for every blood examination the results of which are used for the purposes of these Regulations, being an examination made after the coming into operation of these Regulations.

Blood and other special examinations

29.—(1) As respects any medical examination for the purposes of these Regulations the appointed doctor may at his discretion require an examination of the blood or any other special examination. Any such special examination may be carried out at a place other than the factory.

(2) Every blood examination for the purposes of these Regulations, being an examination made after the coming into operation of these Regulations, shall be made by an approved laboratory or an approved person.

(3) The report of every such blood examination shall be sent to the appointed doctor.

Suspension from employment as a classified worker or in radiation areas

30.—(1) The appointed doctor shall have power, to be exercised by written certificate in the health register signed by him, to suspend from employment as a classified worker or from work in a radiation area any worker examined by him under these Regulations.

(2) No person so suspended shall again be employed as a classified worker or in a radiation area without the written approval of the appointed doctor entered in the health register.

(3) The occupier shall forthwith notify the Chief Inspector whenever any worker is suspended from employment in accordance with these Regulations.

Health register

31.—(1) A health register shall be kept containing the approved particulars of all classified workers and the appointed doctor shall enter in the health register the dates and results of examinations of those persons.

(2) The appointed doctor shall enter in the health register the date and result of any medical examination under Regulation 27 of any worker other than a classified worker.

PART VI

ORGANISATION OF WORK

Marking of radiation area boundaries

32.—(1) There shall where reasonably practicable be a barrier or barriers marking the boundaries of every radiation area or where the use of such barrier or barriers is not reasonably practicable the said boundaries shall be marked by other suitable means.

(2) Suitable notices warning persons in the vicinity shall be displayed at a sufficient number of suitable places on or near to the boundaries of all radiation areas.

Handling of sealed sources.

33. No sealed source shall be handled by direct contact with the bare hand.

Construction and maintenance of sealed sources

34.—(1) The immediate container or the bonding of every sealed source shall be of adequate mechanical strength and free from patent defect.

(2) A distinguishing number or other identifying mark shall be on or attached to every sealed source.

(3) The immediate container or the bonding of every sealed source shall be protected as far as practicable against accidental damage.

(4) An approved test for leakage of radioactive substance shall be made by a qualified person at least once in every period of twenty-six months of—

- (a) every immediate container or bonding which forms part of a sealed source; or
- (b) every container in which a sealed source is permanently installed but which does not form part of the sealed source.

(5) A register shall be kept containing the approved particulars of every test carried out in pursuance of paragraph (4).

Leakage or breakage of a sealed source

35. Where there are reasonable grounds to believe that any radioactive substance is leaking, or is likely to leak, beyond the approved extent from the immediate container or the bonding which forms part of a sealed source, and in the event of the immediate container or the bonding which forms part of a sealed source being broken—

- (a) all practicable measures shall be taken forthwith to safeguard the persons employed, including, where necessary, the immediate vacation of all appropriate areas;
- (b) the immediate container or bonding shall be placed in a leak-proof container forthwith and shall not be brought into use until any necessary repairs have been effected; and
- (c) effective steps shall be taken as soon as practicable by or under the supervision of an authorised person to decontaminate areas affected by the radioactive substance. Any person taking part in such work shall be properly equipped for the purpose.

Accounting for sealed sources

36.—(1) Subject to the provisions of paragraph (2), an authorised person shall keep a record of the following particulars in respect of every sealed source received into the factory—

- (a) the distinguishing number or other identifying mark;
- (b) the date of receipt into the factory;
- (c) the nature of the radioactive substance in the sealed source at the date referred to in sub-paragraph (b);
- (d) the activity expressed in curies of the radioactive substance in the sealed source at a date specified by the authorised person in the record;
- (e) the whereabouts of the sealed source, kept up to date on each working day; and
- (f) the date, and manner of disposal of the sealed source, when it leaves the factory.

Whenever a sealed source is reactivated or, as the case may be, received back into the factory after reactivation, it shall for the purposes of this paragraph be treated as a sealed source received into the factory at the date of reactivation or of receipt back into the factory after reactivation, as the case may be.

(2) Nothing in this Regulation shall apply to sealed sources—

- (a) in the course of their being manufactured; or
- (b) while stored, without having been used, on the premises in which they were manufactured or in which their manufacture was completed.

(3) It shall be the duty of every person employed to notify the competent person forthwith if he has reasonable grounds for believing that any sealed source has been lost or mislaid. The competent person shall take immediate

steps with a view to finding the sealed source and if the sealed source is not accounted for within twenty-four hours, the occupier shall notify the Chief Inspector forthwith in accordance with Regulation 6.

Storage of sealed sources

37.—(1) Sealed sources when not in use shall be kept securely in a suitable store reserved for the storage of radioactive substances and, where reasonably practicable, shall be kept in appropriate protective receptacles.

(2) Where necessary to protect the persons employed from gaseous radioactive substances, adequate and suitable arrangements shall be made for ventilating every such store to the open air by mechanical means.

(3) A suitable notice warning persons in the vicinity shall be kept prominently displayed outside every store which contains a sealed source.

Transport within a factory of sealed sources

38.—(1) No sealed source shall be transported within a factory unless it is transported—

- (a) in a suitable container or by other appropriate methods;
- (b) by or under the immediate supervision of an authorised person; and
- (c) in such a way that the person receiving it is made aware that what he is receiving is a sealed source.

(2) Every container containing any sealed source shall be kept marked with a suitable warning notice to indicate that its contents are radioactive.

PART VII

MONITORING

Provision, maintenance and use of monitoring instruments

39.—(1) The occupier shall ensure that there is provided and properly maintained an appropriate and efficient radiation dosimeter or dose rate meter by means of which appropriate measurements shall be made at such intervals as are necessary for the purpose of ascertaining the efficiency of methods for the restriction of exposure to, and for shielding against, ionising radiations.

(2) Any dosimeter or dose rate meter provided may be provided for use in more than one factory.

(3) The occupier shall ensure that every such radiation dosimeter and dose rate meter when first taken into use in the factory or, as the case may be, in the first of the factories for which it is provided, has been tested by a qualified person, and that it is subsequently re-tested by a qualified person at least once in every period of fourteen months and also after any repair of a defect which could affect its accuracy. There shall be kept a register containing the approved particulars of every test carried out in pursuance of this paragraph.

(4) All measurements shall be made by the competent person or by an authorised person.

PART VIII

RADIOGRAPHY AND OTHER PROCESSES

Application of Part VIII

40. The processes to which this Part applies are:—

- (a) the use of ionising radiations in radiography or fluoroscopy;
- (b) the testing of machines and apparatus intended to produce ionising radiations, not being machines or apparatus to which Regulation 45 or 47 applies;

- (c) the use of ionising radiations in the irradiation of materials for the purpose of inducing chemical, physical or biological changes, including the irradiation of materials for the purposes of sterilisation, disinfection or disinfestation or for the purpose of preserving food, but not including changes induced solely for the purpose of measuring ionising radiations.

Provision of enclosure for ionising radiations

41. The processes to which this Part applies shall be carried on only—

- (a) within a walled enclosure or a cabinet, being an enclosure or cabinet set apart for the purpose which provides adequate shielding and from which are effectively excluded all persons while any machine or apparatus therein which is intended to produce ionising radiations is energised and all persons other than authorised persons when a sealed source is exposed; or
- (b) in accordance with an approved scheme of work as respects which the Chief Inspector is satisfied that the operating and working conditions and the system of control and instruction are such that the radiation doses received by a person working in accordance with the scheme will not exceed the doses permitted in the case of that person under the Schedule:

Provided that (except in cases to which sub-paragraph (b) applies) where ionising radiations are being used in radiography and the provision of such a walled enclosure or such a cabinet is not reasonably practicable, effective steps shall be taken to isolate the radiography from other work and to exclude all except authorised persons from a suitable enclosure or, where the provision of such an enclosure is not reasonably practicable, from a suitably marked area round the work.

Design of walled enclosure or cabinet

42.—(1) Where a walled enclosure or a cabinet is provided—

(a) effective devices shall be provided and maintained—

- (i) to ensure that if any door or part of the walled enclosure or of the cabinet is opened while any machine or apparatus therein is energised the machine or apparatus is automatically de-energised and cannot be energised so long as that door or part is open; and

- (ii) where the walled enclosure or the cabinet is an enclosure or cabinet to which no person is authorised to have access while a sealed source contained therein is exposed, to ensure that no door or part of the enclosure or of the cabinet can be opened while the sealed source is exposed and that the sealed source cannot be exposed while any such door or part is open; and

(b) the control panel for any machine or apparatus therein which is intended to produce ionising radiations shall be situated outside the walled enclosure or cabinet.

(2) Where necessary for the protection of persons who may be accidentally shut inside a walled enclosure or a cabinet, there shall be provided and properly maintained one or more of the following—

- (a) means of exit so constructed that those persons can leave the enclosure or cabinet without delay;
- (b) means whereby those persons can quickly control all the sources of ionising radiations within the enclosure or cabinet;
- (c) shielding for such persons within the enclosure or cabinet appropriate to the circumstances.

(3) Where necessary suitable means of communication shall be provided and maintained to enable persons shut inside a walled enclosure or a cabinet to summon help from outside the enclosure or cabinet.

Warning signals

43.—(1) Adequate warning to all persons in the vicinity shall be given by appropriate light or audible signals or both—

(a) when a sealed source is about to be exposed or when a machine or apparatus is about to be energised; and

(b) while a sealed source is exposed or a machine or apparatus is energised, and the signals given for the purposes of sub-paragraph (a) shall be distinguishable from those given for the purposes of sub-paragraph (b).

(2) In the case of X-ray machines or apparatus the warning signals shall be arranged to operate automatically.

(3) Suitable warning notices capable of being easily read by persons in the vicinity shall be displayed when ionising radiations are about to be used in, and while they are being used in, an enclosure or marked area in pursuance of the proviso to Regulation 41.

Operational precautions

44.—(1) Every sealed source shall be moved only by the use of a handling rod or tool or an automatic or mechanical method or some other suitable method of remote control.

(2) In all the processes (other than radiography) which are carried on within a walled enclosure or a cabinet, while a sealed source is exposed or a machine or apparatus is energised, no material shall be brought into the beam of radiation except by the use of mechanisms operated from outside the walled enclosure or the cabinet.

(3) In radiography, the radiographic set-up shall be completed before the machine or apparatus is energised or before the sealed source is exposed and no changes in the set-up shall be made while the machine or apparatus is energised or otherwise than by the use of remote controls while the sealed source is exposed.

(4) Whenever practicable, fluorescent screens shall be viewed indirectly by the use of inclined mirrors or other means.

PART IX

X-RAY CRYSTALLOGRAPHY AND SPECTROMETRY

Requirements as to X-ray crystallography and spectrometry.

45.—(1) This Regulation applies to X-ray crystallographic apparatus and apparatus used for X-ray spectrometry.

(2) Such apparatus shall be adequately shielded.

(3) Effective arrangements shall be provided, maintained and used to prevent insertion of any part of the body into a useful beam.

(4) Where an X-ray diffraction camera or slit collimating system is in use the useful beam passing between the X-ray tube aperture and the camera or collimating system shall be completely enclosed so as to provide adequate shielding.

(5) Adequate warning to all persons in the vicinity shall be given by appropriate light or audible signals or both while the X-ray tube or apparatus is energised. The warning signals shall be arranged to operate automatically.

PART X

MEASURING AND DETECTING DEVICES AND STATIC ELIMINATORS

Requirements as to sealed sources used in gauges, etc.

46.—(1) This Regulation applies to sealed sources used in thickness gauges, density gauges, package monitors, level gauges, static eliminators, analysers or other analytical, inspection or gauging equipment.

(2) The sealed source shall be provided with an adequate and efficient cover plate, shutter or shield which—

- (a) shall be capable of being easily, securely and quickly placed or moved so as to attenuate the useful beam as far as is reasonably practicable;
- (b) shall be used whenever practicable to attenuate the useful beam and whenever reasonably practicable shall be arranged to operate automatically,

and a means shall be provided to indicate clearly whether or not the cover plate, shutter or shield is in the closed position.

(3) The housing of each sealed source shall be legibly engraved, stamped or otherwise permanently marked to give a warning that it contains radioactive material.

Requirements as to machines and apparatus used in gauges, monitors, etc.

47.—(1) This Regulation applies to machines or apparatus designed to produce ionising radiations (other than machines or apparatus to which Part VIII or IX applies) used in thickness gauges, density gauges, package monitors, level gauges, analysers or other analytical, inspection or gauging equipment.

(2) The machine or apparatus shall be adequately shielded.

(3) Adequate warning to all persons in the vicinity shall be given by appropriate light or audible signals or by both, arranged to operate automatically—

- (a) when a machine or apparatus is about to be energised;
- (b) while a machine or apparatus is energised;
- (c) when any shutter used for the purpose of attenuating the useful beam is about to be opened; and
- (d) while any shutter used for the purpose of attenuating the useful beam is open;

and the signals given for the purposes of sub-paragraphs (a) to (d) shall be distinguishable from each other.

(4) Effective arrangement shall be provided, maintained and used to prevent insertion of any part of the body into a useful beam.

Sealed with the Official Seal of the Ministry of Health and Social Services for Northern Ireland this 26th day of November 1969.

(L.S.)

W. G. H. Quigley,

Assistant Secretary.

Regulations 11(2), 15(1), 16(2), 19(1), 20,
26, 27 and 41

SCHEDULE

Maximum Permissible Radiation Doses

Application of Schedule

1. The doses specified relate to ionising radiations (other than alpha particles emitted by radioactive substances) that originate (otherwise than from radioactive substances within the human body) either in a factory or in a place outside a factory in which any work of a kind specified in Regulation 19(2)(a)(ii) is carried on—

- (a) from any radioactive substance; or
- (b) from any machine or apparatus that is intended to produce ionising radiations or in which charged particles are accelerated by a voltage of not less than five kilovolts not being apparatus exclusively used (in a room specially set apart for the purpose) for the prevention, diagnosis or treatment of illness or injury,

and for the purposes of this Schedule other ionising radiations shall not be taken into account.

Maximum permissible doses

2.—(1) Except as provided in paragraph 3, in any calendar year the maximum permissible sum of doses for persons employed in a factory from any ionising radiations shall be—

- (a) 75 rems to the hands, forearms, feet and ankles of which not more than 40 shall be received in any calendar quarter;
- (b) 15 rems to the lenses of the eyes of which not more than 8 shall be received in any calendar quarter; and
- (c) 30 rems to other parts of the body of which not more than 15 shall be received in any calendar quarter.

The provisions of sub-paragraph (1)(c) shall be without prejudice to the provisions of sub-paragraph (2).

(2) Except as provided in paragraph 3, the sum of doses received in any calendar quarter by any person to parts of the body other than the eyes, hands, forearms, feet and ankles from all or any one or more of the following, (that is to say, X-rays, gamma rays and neutrons shall not exceed 3 rems (or in the case of women 1.3 rems) and the number of rems in the total cumulative dose received therefrom to those parts of the body shall not at any time exceed five times the number of years from the first day of January of the year in which that worker attained the age of eighteen. For the purpose of calculating the doses a part of a year shall be counted as a year. For the purposes of Regulations 15, 16 and 26 the maximum permissible dose in any one year from X-rays, gamma rays and neutrons to parts of the body other than the eyes, hands, forearms, feet and ankles shall be taken to be 5 rems.

- (3) If the occupier is aware that any person employed was during any period—
 - (a) in protected employment; or
 - (b) in employment which, if it had occurred after the coming into operation of any Regulations under the Act, would have been protected employment;
 or

(c) in any other work involving exposure to ionising radiations, for which no information is available to the occupier as to the doses that person received during that period of the kinds, and to the parts of the body, specified in sub-paragraph (2), that person shall, for the purpose of calculating his total cumulative dose referred to in the sub-paragraph, be deemed to have received doses at the rate of five rems a year during that period.

Maximum permissible doses for pregnant female persons

3. In the case of any female person whom the occupier knows, or has reasonable cause to believe, to be pregnant the maximum permissible sum of doses from all or any one or more of the following, that is to say, X-rays, gamma rays and neutrons during the remaining period of her pregnancy shall be one rem.

EXPLANATORY NOTE

(This Note is not part of the Regulations, but is intended to indicate their general purport.)

These Regulations impose requirements for the protection of persons employed in factories and other places to which the Factories Act (Northern Ireland) 1965 applies against ionising radiations arising from radioactive substances sealed in a container or bonded wholly within material or from any machine or apparatus that is intended to produce ionising radiations or in which charged particles are accelerated by a voltage of not less than five kilovolts. These Regulations supersede the Ionising Radiations (Sealed Sources) Regulations (Northern Ireland) 1962.