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1968, 9

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STATUTORY INSTRUMENTS

1969 No. 808

FACTORIES

The Ionising Radiations (Sealed Sources) Regulations 1969

<i>Made</i> - - - - -	12th June 1969
<i>Laid before Parliament</i>	25th June 1969
<i>Coming into Operation—</i>	
<i>Regulations 32, 46 and 47</i>	13th December 1969
<i>Remainder</i> - - - - -	13th July 1969

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REGULATIONS

The Secretary of State—

- (a) by virtue of her powers under sections 76 and 180(6) and (7) of the Factories Act 1961(a) and of all other powers enabling her in that behalf; and
- (b) after publishing, pursuant to Schedule 4 to the said Act of 1961, notice of the proposal to make the Regulations and not having received any objection to the draft in regard to which she is required by the said Schedule to direct an inquiry to be held,

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 1969. Regulations 32, 46 and 47 shall come into operation on 13th December 1969 and the remainder of these Regulations on 13th July 1969.

(2) The Ionising Radiations (Sealed Sources) Regulations 1961(b) are hereby revoked.

(a) 1961 c. 34.

(b) S.I. 1961/1470 (1961 II, p. 2975).

Interpretation

2.—(1) The Interpretation Act 1889(a) shall apply to the interpretation of these Regulations as it applies to the interpretation of an Act of Parliament, and as if these Regulations and the Regulations hereby revoked were Acts of Parliament.

(2) For the purposes of these Regulations, unless the context otherwise requires, the following expressions have the meanings hereby assigned to them respectively, that is to say—

“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 principal 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 principal Act to be appointed factory doctor for the factory for the purposes of these Regulations or of the Ionising Radiations (Sealed Sources) Regulations 1961 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 1961 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 in 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 principal Act with respect to special regulations for safety and health are applied by any of the following provisions of that Act, namely, section 123 (which relates to electrical stations), section 124 (which relates to institutions), so much of section 125 as relates to warehouses other than warehouses belonging to the owners, trustees or conservators of any dock, wharf or quay, section 126 (which relates to ships) and section 127 (which relates to building operations and works of engineering construction);

(a) 1889 c. 63.

“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 principal Act” means the Factories Act 1961;

“protected employment” means employment as respects which requirements are for the time being imposed under the principal 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 principal 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.

(3) References in these Regulations to any enactment shall be construed as references to that enactment as amended by or under any other enactment.

Application of Regulations

3.—(1) Except as provided in paragraphs (4) and (5) of this Regulation, these Regulations shall apply to all factories in which any sealed source is, or is pro-

posed 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 paragraph (1) of this Regulation 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 the last foregoing paragraph 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 of these Regulations, 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) of this Regulation; 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(a), and situate on a site in respect of which a nuclear site licence granted under the said 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) of this paragraph 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 principal Act.

(a) 1965 c. 57.

Exemption certificates

4.—(1) 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.

(2) Exemptions granted under Regulation 4 of the Ionising Radiations (Sealed Sources) Regulations 1961 from requirements of those Regulations shall continue in force and shall have effect as if they were exemptions granted under this Regulation from the corresponding requirements of these Regulations.

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 inspector for the district (which, except in cases of emergency, shall be not less than one month's notice or such shorter notice as the 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) of this Regulation 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 inspector for the district 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 1961.

(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 inspector for the district.

(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 inspector for the district 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 under this Regulation 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 under this Regulation 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 under this Regulation, any reference in these Regulations to the competent person appointed in accordance with this Regulation 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 inspector for the district 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 1961 and every transfer record and copy transfer record received by an employer in pursuance of Regulation 22 of these Regulations or of Regulation 31 of the said Regulations of 1961 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) of these Regulations or of Regulation 15(5) of the said Regulations of 1961 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 as aforesaid has been approved, the provisions of this Regulation may be complied with as respects the said 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 to these Regulations.

Provision of shielding against ionising radiations

12. Without prejudice to the other requirements of these Regulations 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 to these Regulations, 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, that is to say—

- (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 the next following paragraph; and in these Regulations the expression “classified worker” shall be construed accordingly.

(2) In the foregoing paragraph of this Regulation “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 to these Regulations.

(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) of this Regulation.

(2) The occupier shall obtain the said 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) of this Regulation, 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 to these Regulations 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 principal 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) of this paragraph,

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 in pursuance of the foregoing paragraph of this Regulation, the particulars contained in the said 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 to these Regulations, 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 as aforesaid confirms a report made under the foregoing paragraph of this Regulation 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 to these Regulations, the occupier shall forthwith—

- (a) notify the appointed doctor;
- (b) notify the inspector for the district; 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 to these Regulations, 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 inspector for the district.

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 inspector for the district.

(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 said 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 the last foregoing paragraph of this Regulation, the occupier shall forthwith apply to the inspector for the district 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 of these Regulations.

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 said 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 said 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 to these Regulations.

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 to these Regulations, 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 to these Regulations.

Place of medical examinations and duty of persons concerned

28.—(1) Except where otherwise authorised or directed in writing by the inspector for the district, 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(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 as aforesaid 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 inspector for the district 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) of this Regulation.

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) of this Regulation, an authorised person shall keep a record of the following particulars in respect of every sealed source received into the factory, that is to say—

- (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 inspector for the district 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 under this Regulation 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 under this Regulation shall be made by the competent person or by an authorised person.

PART VIII

RADIOGRAPHY AND OTHER PROCESSES

Application of Part VIII of these Regulations

40. The processes to which this Part of these Regulations 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 purpose 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 of these Regulations 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 to these Regulations:

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, that is to say—

- (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) of this paragraph 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) Apparatus to which this Regulation applies 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 to which this Regulation applies 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 said 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 of these Regulations 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) of this paragraph 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.

12th June 1969.

Barbara Castle,
First Secretary of State and Secretary
of State for Employment and Productivity.

SCHEDULE

MAXIMUM PERMISSIBLE RADIATION DOSES

Application of Schedule

1. The doses specified in this Schedule 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 of this Schedule, 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 (c) of this sub-paragraph shall be without prejudice to the provisions of sub-paragraph (2) of this paragraph.

(2) Except as provided in paragraph 3 of this Schedule, 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 said 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 principal 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) of this paragraph, that person shall, for the purpose of calculating his total cumulative dose referred to in the said 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.)

These Regulations impose requirements for the protection of persons employed in factories and other places to which the Factories Act 1961 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 1961 which are revoked.

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STATUTORY INSTRUMENTS

1968 No. 780

FACTORIES

**The Ionising Radiations (Unsealed Radioactive Substances)
Regulations 1968**

Made- - - - 14th May 1968
Laid before Parliament 27th May 1968

Coming into Operation—

Regulations 1(1) and 2 to 5 and
the Schedules 29th May 1968
Remainder 15th November 1968

ARRANGEMENT OF REGULATIONS

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SCHEDULES

SCHEDULE 1 —	Maximum permissible radiation doses
SCHEDULE 2 —	Maximum permissible levels of contamination and method of assessment
SCHEDULE 3 —	Classification of radionuclides

REGULATIONS

The Minister of Labour—

- (a) by virtue of the powers conferred on her by sections 62, 76 and 180(6) and (7) of the Factories Act 1961(a) and of all other powers enabling her in that behalf; and
- (b) after publishing, pursuant to Schedule 4 to the said Act of 1961, notice of the proposal to make the Regulations and not having received any objection to the draft in regard to which she is required by the said Schedule to direct an inquiry to be held,

hereby makes the following special Regulations:—

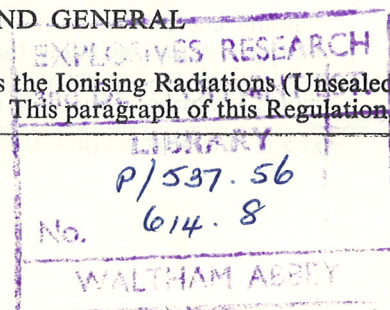
PART I

INTERPRETATION AND GENERAL

Citation, commencement and revocation

1.—(1) These Regulations may be cited as the Ionising Radiations (Unsealed Radioactive Substances) Regulations 1968. This paragraph of this Regulation

(a) 1961 c. 34.



Library No. P/10911

Regulations 2 to 5 and the three Schedules shall come into operation on 29th May 1968, and the remainder of these Regulations on 15th November 1968.

(2) The Factories (Luminising) Special Regulations 1947(a) are hereby revoked.

Interpretation

2.—(1) The Interpretation Act 1889(b) shall apply to the interpretation of these Regulations as it applies to the interpretation of an Act of Parliament, and as if these Regulations and the Regulations hereby revoked were Acts of Parliament.

(2) For the purposes of these Regulations, unless the context otherwise requires, the following expressions have the meanings hereby assigned to them respectively, that is to say—

“active area” means a part of a factory, other than a tracer area or the inside of a total enclosure or of a fume cupboard, in which any operation involving the manipulation or use of any radioactive substance is carried on as a result of which there is, or under normal operating conditions is liable to be,

(a) contamination to a level in excess of the levels specified for category D in Schedule 2 to these Regulations; or

(b) airborne or gaseous radioactive substances in the atmosphere to such an extent that persons employed in the area are likely to inhale, ingest or absorb a significant amount;

“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(5) applies;
- (ii) for the purpose of implementing any arrangements made thereunder with employers of classified workers, as respects any factory to which Regulation 3(6) applies; and
- (iii) for the purposes of any medical examination in pursuance of Regulation 28(1)(a),

any fully registered medical practitioner appointed to be a factory doctor for any of the purposes of the principal 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 principal Act to be appointed factory doctor for the factory for the purposes of these Regulations 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 by certificate of the Chief Inspector;

“article” includes a part of an article;

“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;

(a) S.R. & O. 1947/865 (Rev. VII, p. 384: 1947 I, p. 721).

(b) 1889 c. 63.

“authorised person” in any of these Regulations means a person authorised for the time being 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 in Regulation 18(1);

“clothing” means any clothing other than personal protective equipment;

“competent person” means a person appointed in pursuance of Regulation 8;

“contamination” means the contamination by any unsealed radioactive substance of any surface (including any surface of the body and clothing) or any part of absorbent objects or materials and the expression “contaminated” shall be construed accordingly;

“decontamination area” means a part of a factory, not being an active area, in which the only work with radioactive substances carried on is the decontamination of objects contaminated to a level in excess of the levels specified for category D in Schedule 2 to these Regulations and work in connection with such decontamination;

“factory” means any factory and any premises, places, processes, operations and works to which the provisions of Part IV of the principal Act with respect to special regulations for safety and health are applied by any of the following provisions of that Act, namely, section 123 (which relates to electrical stations), section 124 (which relates to institutions), so much of section 125 as relates to warehouses other than warehouses belonging to the owners, trustees or conservators of any dock, wharf or quay, section 126 (which relates to ships) and section 127 (which relates to building operations and works of engineering construction);

“fume cupboard” means a partial enclosure—

(a) having mechanical means of producing at any opening between it and the workplace a flow of air into it which has a velocity (being in any event a velocity not less than 50 centimetres per second) and is otherwise such as to prevent the spread of radioactive substance from the enclosure into the workplace; and

(b) where the said flow of air is not kept in constant operation, provided with a shutter which is kept in its closed position when the flow of air is not in operation and which is such that when the shutter is in its closed position the enclosure is a total enclosure;

“health register” means the register referred to in Regulation 34;

“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 53 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;

"personal protective equipment" means any clothes or appliances intended to be worn on the person and provided under these Regulations to prevent the inhalation, ingestion or other absorption into the body of unsealed radioactive substances or to prevent contamination of the person or of the clothing;

"the principal Act" means the Factories Act 1961;

"protected employment" means employment as respects which requirements are for the time being imposed under the principal 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 22(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;

"total enclosure" means an enclosure (other than a fume cupboard and a tracer area) which is so enclosed as to prevent the escape of any unsealed radioactive substance therein into any workplace and which, if it were not a total enclosure, would be an active area;

"tracer area" means a part of a factory in which the only work being done involving any unsealed radioactive substance is tracer work or in which there is as a result of tracer work—

(a) contamination to a level in excess of the levels specified for category D in Schedule 2 to these Regulations; or

(b) airborne or gaseous radioactive substance in the atmosphere to such an extent that the persons employed in the area are likely to inhale ingest or absorb a significant amount;

"tracer work" means the manipulation or use of any unsealed radioactive substance for the purpose of investigating working methods or of investigating the operation of machines, plant, apparatus or processes or for the purposes of design or of production control;

"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 principal Act (including the requirements of these Regulations);

"unsealed radioactive substance" means any radioactive substance that is not a sealed source.

(3) Any reference in these Regulations to a numbered class of radionuclides is a reference to the class of radionuclides so numbered in the Table set out in Schedule 3 to these Regulations.

(4) References in these Regulations to any enactment shall be construed as references to that enactment as amended by or under any other enactment.

(5) In determining whether on any particular occasion or at any particular time an amount of any radioactive substance is, or amounts of radioactive substances are, for the purposes of these Regulations, significant, regard shall be had to the possible effects on persons employed and to this end account shall be taken (amongst other things) of the following, namely,—

(a) the nature or natures of the radioactive substance or radioactive substances present;

(b) the concentration of the radioactive substance or radioactive substances present in the air and the duration of its or their presence.

Application of Regulations

3.—(1) Except as provided in paragraphs (2) to (4) of this Regulation, these Regulations shall apply to all factories—

(a) in which (except in the case of the substances specified in sub-paragraph (b) of this paragraph) there is an amount of unsealed radioactive substance in any workplace or store the total activity of which exceeds one microcurie where it is derived from Class I radionuclides, ten microcuries where it is derived from Class II radionuclides or Class III radionuclides or one hundred microcuries where it is derived from Class IV radionuclides; or

(b) in which there is in any workplace or store any of the following unsealed radioactive substances of an amount the total activity of which exceeds that specified in the case of each substance, that is to say, radium activated luminising compounds having a total activity exceeding ten microcuries, tritium activated luminising compounds having a total activity exceeding fifty millicuries and promethium activated luminising compounds having a total activity exceeding two millicuries; or

(c) in which there is any object contaminated to a level in excess of the levels specified for category B in Schedule 2 to these Regulations.

(2) For the purposes of the foregoing paragraph of this Regulation, none of the following shall, except in any factory in which it is manufactured or repaired, be regarded as being or containing unsealed radioactive substances, that is to say—

(a) any luminised article;

(b) any incandescent mantle;

(c) any fired ceramic article made wholly or partly from natural thorium dioxide;

(d) any alloy containing as its sole radioactive constituent 4 per cent. or less by weight of natural thorium or compounds of natural thorium;

(e) any compound of uranium used or intended for use as a pigment and not containing any significant amount of any other radioactive substance; and

(f) any amount not exceeding ten kilograms of thorium or uranium or any of their chemical compounds where used or intended for use as a chemical reagent and not containing any significant amount of any other radioactive substance.

- (3) Only Regulations 1 to 5, 8 and 12 to 17 of these Regulations shall apply—
- to the storage, manipulation or use of luminised articles in the manufacture or repair of further luminised articles of which they form part, provided in any case that no surface is thereby contaminated to a level in excess of the levels specified for category D in Schedule 2 to these Regulations; and
 - to any warehouse (not being a warehouse belonging to the owners trustees or conservators of any dock, wharf or quay) to which section 125 of the principal Act applies.
- (4) Nothing in these Regulations shall apply to any site during such time as a nuclear site licence granted under the Nuclear Installations Act 1965(a) is in force in respect of that site by reason of the presence thereon of—
- a nuclear reactor; or
 - an 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 said Act of 1965.
- (5) Where in any factory the occupier is neither the owner nor the hirer of an unsealed radioactive substance which is used by or under the direction of some person other than the occupier or a person in the employment of the occupier and there is no radioactive substance in the factory of which substance the occupier is owner or hirer, 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 unsealed radioactive substance, be deemed to be the occupier of the factory for the purposes of these Regulations.
- (6) Where in any factory (other than a factory to which the last foregoing paragraph 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 of these Regulations, 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.
- (7) Save as expressly provided in Regulation 39(1), 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 principal 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—

- any factory or part of any factory; or
- any class or description of factories or parts thereof; or
- any machine, plant, apparatus, process, article or substance or any class or description of machines, plant, apparatus, processes, articles or substances; or
- 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.

(a) 1965 c. 57.

PART II

ADMINISTRATION, NOTIFICATIONS AND RECORDS

Notification of use and disuse of unsealed radioactive substances

5.—(1) The occupier shall give previous notice in writing to the inspector for the district (which, except in cases of emergency, shall not be less than one month's notice or such shorter notice as the inspector may agree to accept) before using a factory as a factory to which these Regulations apply for the first time after the date of commencement of this Regulation (that is to say, at the expiration of fourteen days from the making of these Regulations) or for the first time after a notice under paragraph (2) of this Regulation given in respect of the factory has expired.

(2) When the occupier intends to cease using the factory as a factory to which these Regulations apply (otherwise than merely temporarily) he shall give not less than one month's notice in writing to the inspector for the district or such shorter notice as the inspector may agree to accept.

Recording of active areas

6.—(1) Particulars identifying all active areas which remain active areas for seven or more consecutive days, shall be entered forthwith in a register kept for the purpose.

(2) Whenever any area particulars whereof have been entered in the register ceases, otherwise than temporarily, to be an active area, the occupier shall forthwith make an entry in the register accordingly.

Notification of accidents

7. The inspector for the district shall be notified in writing of any loss of any unsealed radioactive substance in the circumstances specified in Regulation 45(2) and of the following occurrences as soon as possible after they are discovered, that is to say—

- a spill or other accidental escape of any unsealed radioactive substance (otherwise than within a total enclosure or fume cupboard) which there is reason to believe has a total activity greater than one hundred microcuries of a Class I radionuclide, ten millicuries of a Class II radionuclide, one curie of a Class III radionuclide or one hundred curies of a Class IV radionuclide or, in the case of gaseous radioactive substances, one tenth of those amounts; and
- any unintended fire or explosion that involves or affects any unsealed radioactive substance which there is reason to believe has a total activity greater than one hundred microcuries of a Class I radionuclide, ten millicuries of a Class II radionuclide, one curie of a Class III radionuclide or one hundred curies of a Class IV radionuclide or, in the case of gaseous radioactive substances, one tenth of those amounts.

Appointment of a competent person

8.—(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 under this Regulation for different parts of the factory or for different processes the name shall be posted in such a manner that the persons employed can readily identify the

competent person or competent persons appointed under this Regulation 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 under this Regulation any reference in these Regulations to the competent person appointed in accordance with this Regulation 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

9. The competent person appointed in accordance with Regulation 8 shall be informed of every matter which is required to be notified to the inspector for the district under Regulation 7.

Investigations by the competent person

10. In addition to his other duties, the competent person appointed in accordance with Regulation 8 shall investigate the circumstances of every occurrence notified to him under Regulation 9 or Regulation 44(1) and report thereon to the occupier with a recommendation as to the action to be taken.

Preservation of records

11. Every register, certificate or record kept in pursuance of these Regulations and every transfer record and copy transfer record received by an employer in pursuance of Regulation 25 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 and two years in all other cases: Provided that where an extract from or a summary of any such document or documents as aforesaid has been approved the provisions of this Regulation may be complied with as respects the said extract or summary (as the case may be) in place of the document or documents from which the extract, or of which the summary, has been made.

PART III

BASIC PRINCIPLES OF PROTECTION

Restriction of exposure to ionising radiations

12.—(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 17 for the time being in force and applicable to him, no person shall receive any radiation dose in excess of those permitted under Schedule 1 to these Regulations.

Prevention of inhalation and ingestion of radioactive substances and of contamination

13. Without prejudice to the other requirements of these Regulations, the occupier shall do all that is reasonably practicable to prevent the inhalation and the ingestion by any person employed of any radioactive substance arising

from any work carried on in the factory and to prevent the contamination of the body or of the clothing of any person employed by any radioactive substance arising from any work carried on in the factory; and no person employed shall expose himself to any risk of inhaling or ingesting any radioactive substance, or of contaminating his body or his clothing, to a greater extent than is reasonably necessary for the purposes of his work.

Protection against contamination

14. All work in any factory to which these Regulations apply shall be so conducted as to protect persons employed so far as is reasonably practicable—

- (a) from contamination; and
- (b) from airborne or gaseous radioactive substances.

Provision of shielding against ionising radiations

15. All sources of ionising radiations shall, where reasonably practicable, be adequately shielded.

Instruction of persons employed

16. 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

17.—(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, radiation doses greater than three-tenths of the doses permitted under Schedule 1 to these Regulations, or that any person employed may have inhaled, ingested or absorbed, or is likely to inhale, ingest or absorb, significant amounts of any unsealed radioactive substance, 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, that is to say—

- (a) for the wearing by any person employed of photographic film or an appropriate radiation dosimeter, and for the keeping and preserving of records of doses received;
- (b) for the monitoring of any person employed or 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 or to have the amount of radioactive substances in his body determined or to be monitored.

PART IV RADIOLOGICAL SUPERVISION

Classified workers

18.—(1) Except as provided in Regulation 19, 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 tracer areas, total enclosures, active areas or radiation areas in—

- (a) work with unsealed radioactive substances or immediately ancillary work;
- (b) the cleaning of tracer areas, total enclosures, fume cupboards or active areas; or
- (c) the manipulation, cleaning or maintenance of any of the following which is contaminated or is likely to be contaminated in excess of the levels specified for category D in Schedule 2 to these Regulations, that is to say, plant, apparatus, equipment (including personal protective equipment), materials or articles,

not being persons employed in accordance with an approved scheme of work within the meaning of the next following paragraph; and in these Regulations the expression "classified worker" shall be construed accordingly.

(2) In the foregoing paragraph of this Regulation "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 1.5 rems and is not likely to inhale, ingest or absorb significant amounts of unsealed radioactive substances.

(3) No person under the age of 18 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.

Exception from Regulation 18

19. Designation as a classified worker shall not be required in accordance with Regulation 18 in the case of any person by reason only of the fact that he is employed in a tracer area on not more than fourteen days in any calendar year.

Current employment in more than one factory

20. 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; and

(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; and

(c) the references to the health register in Regulations 28, 33 and 34 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 31(1) to the factory shall be taken as a reference to any one of those factories.

Film badges and dosimeters

21.—(1) The occupier shall make suitable arrangements for the wearing on an appropriate part or parts of his person by every classified worker who works for any of his time in a radiation area 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 such classified worker to wear in a proper manner any film or dosimeter provided for him in pursuance of this Regulation.

(2) The occupier shall obtain the said films, the 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

22.—(1) Subject to the provisions of paragraph (2) of this Regulation, a radiation dose record shall be kept containing as respects each classified worker the approved particulars of the maximum radiation doses permitted under Schedule 1 to these Regulations 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 17 or 24.

(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 principal Act (including these Regulations) for recording the radiation doses received by the persons employed in such work, but which if, after the date of the 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) of this paragraph,

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 in pursuance of the foregoing paragraph of this Regulation, the particulars contained in the said 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 21(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 that period.

Excessive exposure of persons employed

23.—(1) Whenever any person has reasonable cause to believe as respects himself (if employed) or any other person employed—

(a) that he has received any radiation dose in excess of that permitted under Schedule 1 to these Regulations; or

(b) that he has inhaled or ingested or otherwise absorbed a significant amount of any radioactive substance; or

(c) that contamination to a level greater than ten times the level specified for the body in Schedule 2 to these Regulations has persisted on any part of his body for more than three days,

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 as aforesaid confirms a report made under the foregoing paragraph of this Regulation or the occupier has other reason to believe that any person employed has suffered any of the events specified in the foregoing paragraph of this Regulation, the occupier shall forthwith—

(a) notify the appointed doctor;

(b) notify the inspector for the district; 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 Schedule 1 to these Regulations, 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 inspector for the district.

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

24.—(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 respects 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

25.—(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 inspector for the district.

(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 said 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 the last foregoing paragraph of this Regulation, the occupier shall forthwith apply to the inspector for the district for a copy of that record.

PART V

MEDICAL SUPERVISION

Arrangements for supervision

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

Facilities for appointed doctor

27.—(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

28.—(1) Subject to paragraph (2) of this Regulation, 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 said 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 said doctor.

(2) In the case of any person who, at the date of commencement of this Regulation (that is to say, at the expiration of six months from the making of these Regulations), is employed in any factory on work as respects which he is required under these Regulations to be designated as a classified worker, paragraph (1) of this Regulation shall not in relation to that factory apply until his next first employment in that factory.

(3) 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

29. The occupier shall arrange for medical examinations by the appointed doctor as follows, that is to say—

- (a) in the case of any such person as is mentioned in paragraph (2) of Regulation 28, within fourteen months of the coming into operation of this Regulation (that is to say, at the expiration of six months from the making of these Regulations), a medical examination which shall include a blood examination unless the report of the results of an earlier blood examination of that person is available and known to the appointed doctor;
- (b) in the case of every worker who is a classified worker by reason only of the fact that he works for any of his time in a radiation area, medical examinations in the first calendar quarter of 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 radiation dose which is greater than three-tenths of the doses permitted under Schedule 1 to these Regulations; and
- (c) in the case of every classified worker, other than a worker to whom paragraph (b) of this Regulation applies, medical examinations at intervals of not more than fourteen months so long as his employment as a classified worker continues.

Special medical examination of persons employed

30. Where the occupier has notified the appointed doctor on the occurrence of any of the events specified in Regulation 23, 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 Schedule 1 to these Regulations.

Place of medical examinations and duty of persons concerned

31.—(1) Except where otherwise authorised or directed in writing by the inspector for the district, 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(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 32(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 this Regulation (that is to say, at the expiration of six months from the making of these Regulations).

Blood and other special examinations

32.—(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 this Regulation (that is to say, at the expiration of six months from the making of these Regulations), shall be made by an approved laboratory or an approved person.

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

Suspension from employment as a classified worker

33.—(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 total enclosures, active areas, decontamination areas, radiation areas or tracer areas any worker examined by him under these Regulations.

(2) No person so suspended shall again be employed as a classified worker or in total enclosures, active areas, decontamination areas, radiation areas or tracer areas (as the case may be) without the written approval of the appointed doctor entered in the health register.

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

Health register

34.—(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 30 of any worker other than a classified worker.

PART VI

ARRANGEMENT OF PREMISES AND PLANT

Marking of area boundaries

35.—(1) There shall where reasonably practicable be a barrier or barriers marking the boundaries of every active area and 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 employed shall be displayed at a sufficient number of suitable places on or near to the boundaries of all total enclosures, active areas, radiation areas and tracer areas.

Provision and use of enclosures

36. Where necessary for the protection of persons employed, work with any unsealed radioactive substance (other than tracer work) shall be carried on—

(a) so far as reasonably practicable, within total enclosures or fume cupboards; or

(b) where the provision of total enclosures or fume cupboards is not reasonably practicable, with the use under such arrangements as are practicable of an exhaust draught produced by mechanical means and discharged to the open air so as to reduce as far as possible the risk of contamination or inhalation or ingestion of airborne or gaseous radioactive substances.

Construction of active areas and their furniture

37.—(1) So far as is practicable, the floor of every active area shall have an impervious surface, be capable of being easily and effectively cleaned and of containing any spill of any unsealed radioactive substance, and be kept free from any obstruction.

(2) All benches, tables and seats in every active area shall so far as is reasonably practicable have impervious surfaces and be capable of being easily and effectively cleaned.

(3) Every bench and table within an active area which is used for work with radioactive substances shall be kept free from articles not required for the work carried on at that bench or table and any such bench or table at which more than one person is employed shall have sufficient unobstructed working space for each person.

Accommodation for personal protective equipment

38.—(1) Suitable accommodation shall be provided and maintained for the storage of the personal protective equipment required to be provided under Regulation 40(1). The accommodation shall be kept in a clean and orderly condition and shall be separate from that provided for clothing not worn during working hours.

(2) The accommodation provided under the foregoing paragraph of this Regulation for personal protective equipment which is liable to be contaminated to a level in excess of the levels specified for category B in Schedule 2 to these Regulations shall be—

(a) where reasonably practicable so situated as to allow the persons using the accommodation to use the washing facilities provided in pursuance of Regulation 39 in the course of changing their clothes; and

(b) situated as close as practicable to the area in which the work is carried on for which the personal protective equipment is required.

Washing facilities

39.—(1) There shall be provided and maintained for the use of all persons working in active areas, decontamination areas or total enclosures or at or in fume cupboards and, where reasonably practicable, for their exclusive use, adequate and suitable facilities for washing which shall be kept in a clean and orderly condition and be under cover and shall be immediately accessible or, where this is not reasonably practicable, conveniently accessible, from the workplace. The said facilities shall include a supply of clean running hot and cold or warm water, soap, non-abrasive nail brushes and clean towels, and, in addition, either—

(a) a trough with smooth impervious surface of such length (or, in the case of a circular or oval trough, of such circumference) as to allow sixty centimetres for every five persons and fitted with suitable jets or sprays serving each sixty centimetres of length or circumference (as the case may be) and with a waste pipe without plug; or

(b) for every five persons at least one basin with smooth impervious surface of suitable size fitted with suitable jets or sprays and with a waste pipe.

As respects persons working in places to which section 58 of the principal Act applies, being persons for whom washing facilities are required to be provided under this paragraph, the provisions of this paragraph shall be in substitution for the provisions of subsection (1) of that section (which relates to the provision of washing facilities).

(2) Where the washing facilities provided in accordance with the foregoing paragraph of this Regulation are not immediately accessible from any workplace, there shall be provided at the workplace for use in cases of emergency appropriate means for cleansing the skin, which shall include a supply of clean water.

(3) All jets and sprays provided as part of the washing facilities under paragraph (1) of this Regulation shall be such that they can be conveniently operated without using the hands.

(4) The name or names or designations of the person or persons authorised for the purposes of Regulations 44(1) and 54(1) shall be kept prominently displayed near every washing facility provided in accordance with paragraph (1) of this Regulation.

(5) Every person shall be allowed sufficient time in the course of his work for washing as required by these Regulations.

PART VII
PERSONAL PROTECTION

Personal protective equipment

40.—(1) Suitable personal protective equipment shall be provided and properly maintained for the use of all persons employed in work in active areas, tracer areas, decontamination areas, total enclosures or at or in fume cupboards. The protective equipment provided shall include—

- (a) protective clothes adequate to prevent any contamination of the bodies of the persons for whom it is provided or of their other clothing to a level in excess of the appropriate level specified in Schedule 2 to these Regulations; and
- (b) a sufficient supply of breathing apparatus, where necessary, to prevent risk resulting from inhalation or ingestion of any radioactive substance.

(2) The breathing apparatus provided in accordance with the foregoing paragraph of this Regulation shall be thoroughly examined before first issue for use in the factory, and thereafter at least once a month, by a person competent to make such an examination; and a report shall be made on every such examination, signed by the person making the examination and containing the particulars for the time being prescribed for a report on an examination under section 30(6) (which requires the provision of breathing apparatus) of the principal Act, and shall be kept available for inspection: Provided that an examination and report in accordance with this Regulation shall, in the case of breathing apparatus which is kept in store and has not been issued for use, be required once in every six months.

(3) Every breathing apparatus provided in accordance with paragraph (1)(b) of this Regulation shall carry a distinguishing mark and no person shall wear or be required to wear any such breathing apparatus which has previously been worn by another person, unless it has since been thoroughly disinfected.

(4) Every person while engaged in work for use in the course of which personal protective equipment has been provided in accordance with paragraph (1) of this Regulation shall wear the personal protective equipment provided for his use in the course of that work.

(5) Every person leaving work for use in the course of which personal protective equipment is provided in accordance with paragraph (1) of this Regulation shall forthwith deposit his personal protective equipment in the accommodation provided for it in pursuance of Regulation 38(1) and then wash his hands.

(6) No person shall place his head inside a fume cupboard unless he is wearing protective equipment.

(7) After any person has washed his hands in accordance with paragraph (5) of this Regulation or with Regulation 42(1) an appropriate measurement shall be made without delay, if necessary to ensure that any contamination of his hands to a level in excess of the appropriate level specified in Schedule 2 to these Regulations is detected: Provided that if in any case the only radioactive substance from which there is a liability to contamination of any person is a luminising compound, it shall be a sufficient compliance with the foregoing provisions of this paragraph in that case to make an appropriate examination by means of an ultra violet lamp without delay of the hands of every such person.

(8) If contamination of any person is detected as a result of any measurement or examination in pursuance of the last foregoing paragraph of this Regulation, such steps shall be taken by that person as are reasonably practicable to remove the contamination.

(9) It shall be the duty of every person employed to comply with the requirements of paragraphs (4) to (8) of this Regulation in so far as he is affected thereby and to submit himself to measurement or examination in accordance with those provisions.

Protection of cuts and breaks in the skin

41. No person having any cut or other break in his skin shall work in an active area, decontamination area, tracer area or total enclosure or at or in a fume cupboard unless that cut or other break in his skin is so covered as to prevent the entry of any radioactive substance.

Personal hygiene

42.—(1) No person working in an active area, decontamination area, tracer area or total enclosure or at or in a fume cupboard shall—

- (a) make use of a sanitary convenience unless, since last working as aforesaid, he has washed his hands;
- (b) partake of food or drink or snuff or make use of cosmetics or tobacco there, except that a person may drink from a drinking fountain so constructed that there is no risk of contamination of the water;
- (c) make use there of any pocket handkerchief other than a paper handkerchief; or
- (d) operate there by means of his mouth any plant, apparatus or equipment.

(2) An adequate and convenient supply of suitable paper handkerchiefs shall be provided for use in accordance with paragraph (1)(c) of this Regulation. Arrangements shall be made for the deposit of the used paper handkerchiefs in a suitable receptacle provided for the purpose in the workroom or in, or adjacent to, the accommodation provided in pursuance of Regulation 38(1) for protective equipment. Such receptacles shall be emptied at least once on every working day and the used handkerchiefs shall be treated as contaminated articles in accordance with Regulation 47.

Implements for the application of radioactive substances

43.—(1) Brushes shall not be used for the application of luminising compounds.

(2) Brushes used for the application of radioactive substances other than luminising compounds shall be used only in total enclosures.

First aid

44.—(1) When any person during his work in an active area, decontamination area, tracer area or total enclosure or at or in a fume cupboard sustains any cut or other break in the skin, he shall promptly present himself to an authorised person, who shall ensure that appropriate first-aid treatment is given and that in the giving of such treatment account is taken of any contamination present in or around the cut or break in the skin, or on the instrument (if any) which

caused it. Where any such contamination is present, the occurrence shall be notified forthwith to the competent person.

(2) The contents of any first-aid box or cupboard required by or under the principal Act shall include an adequate supply of appropriate waterproof dressings.

PART VIII ORGANISATION OF WORK

Accounting for unsealed radioactive substances

45.—(1) The occupier shall keep a record of all radioactive substances received into the factory and, so far as is reasonably practicable, of their subsequent disposal.

(2) It shall be the duty of every person employed to notify the competent person forthwith if he has reasonable grounds for believing that any unsealed radioactive substance has been lost or mislaid. The competent person shall take immediate steps with a view to finding the substance; and if the substance is not accounted for within twenty-four hours the occupier shall notify the inspector for the district forthwith.

Storage of unsealed radioactive substances

46.—(1) Unsealed radioactive substances when not in use shall where reasonably practicable be kept in appropriate protective receptacles which shall be kept securely in a suitable store reserved for the storage of radioactive substances.

(2) Where necessary to protect the persons employed from airborne or 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 warning notice shall be kept prominently displayed outside every store which contains an amount of unsealed radioactive substance of which the total activity exceeds the amounts specified in Regulation 3(1).

Transport within a factory of unsealed radioactive substances

47.—(1) No unsealed radioactive substance and no plant, apparatus, equipment, material or article, being plant, apparatus, equipment, material or an article which is contaminated to a level in excess of the levels specified for category D in Schedule 2 to these Regulations shall be transported within a factory (other than within an active area) unless it is transported—

- (a) in a suitable container which shall, where necessary, be so designed and constructed as to prevent the spread of contamination or of airborne or gaseous radioactive substances;
- (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 an unsealed radioactive substance or is contaminated (as the case may be).

(2) Before being despatched from the factory any article which consists of or contains an amount of radionuclides in unsealed radioactive substances exceeding the amounts specified in Regulation 3(1) or consists of or contains

any object contaminated to a level in excess of the levels specified for category D in Schedule 2 to these Regulations, shall be labelled so as to indicate that it is such an article.

Amounts of unsealed radioactive substances

48.—(1) The amounts of unsealed radioactive substances in any active area, decontamination area, radiation area, tracer area, total enclosure or fume cupboard shall be kept to the minima reasonably practicable.

(2) Where the amount of fissile substance present in a factory at any time is sufficient under any possible conditions to enable a self-sustaining nuclear chain reaction to occur, effective precautions shall be taken to prevent it from occurring. Nothing in this paragraph shall apply to self-sustaining reactions that have been designed and intended as such.

Measures to prevent accidental escapes of unsealed radioactive substances

49.—(1) The working arrangements shall be such that, in the event of a spill, dispersal of the unsealed radioactive substances shall be prevented so far as is reasonably practicable.

(2) Adequate steps shall be taken to prevent an unintended build-up of pressure inside containers for unsealed radioactive substances.

(3) Containers for unsealed radioactive substances shall so far as reasonably practicable be so designed and constructed that their contents cannot escape accidentally.

Spills and accidental escapes of unsealed radioactive substances

50.—(1) Whenever (otherwise than within a total enclosure or a fume cupboard) there is a spill or other accidental escape of unsealed radioactive substances which there is reason to believe have a total activity greater than 10 microcuries of a Class I radionuclide, 1 millicurie of a Class II radionuclide, 100 millicuries of a Class III radionuclide or 10 curies of a Class IV radionuclide, or, in the case of gaseous radioactive substances, one-tenth of each of these amounts, no person (other than properly trained and equipped persons who enter or remain therein solely for the purpose of dealing with the spill or escape) shall enter or remain in the area affected until an authorised person has declared that in his opinion it is safe to do so. A record shall be made in a register kept for this purpose of the date, nature and place of the spill or other accidental escape.

(2) It shall be the duty of every person employed to notify the occupier forthwith if he has reasonable grounds for believing that there has been a spill or other accidental escape of unsealed radioactive substances to which the provisions of the foregoing paragraph of this Regulation apply.

Cleaning of active and tracer areas

51.—(1) All active areas and tracer areas and all plant, apparatus and equipment therein or which has been therein shall be cleaned often enough to ensure that any contamination on them does not exceed the appropriate levels specified in Schedule 2 to these Regulations.

(2) The cleaning of active areas and tracer areas and plant, apparatus and equipment shall be done by methods which avoid, so far as is practicable, the spread of contamination and the dispersal of unsealed radioactive substances in the general air of any room.

(3) Materials and articles which have been used for cleaning as required by this Regulation and are contaminated—

- (a) shall not be used for any other purpose (except for the purpose of cleaning in pursuance of Regulation 57); and
- (b) shall, when stored or being transported within a factory, be treated as if they were unsealed radioactive substances.

Entry of total enclosures

52.—(1) No person shall break the containment of any total enclosure or enter any total enclosure or fume cupboard in which, in any such case, there is or is liable to be contamination to a level in excess of the levels specified for category B in Schedule 2 to these Regulations or enter any ducting or drains leading into or from such an enclosure or cupboard unless there is in force in respect of that person written permission in accordance with paragraph (2) of this Regulation for him to do so.

(2) Every written permission issued for the purposes of paragraph (1) of this Regulation shall state—

- (a) the name of the person or persons in respect of whom it is issued;
- (b) the enclosure, cupboard and work to which it relates;
- (c) any special conditions under which the work is to be carried out;
- (d) the period (not exceeding seven days or such longer period as may be approved) for which it is valid; and
- (e) the date of its issue,

and shall be signed by the competent person or by a person authorised in that behalf by the competent person and countersigned by the supervisor, foreman or other person in charge of the place in which the work is to be carried out.

PART IX

MONITORING AND MEASURES TO DEAL WITH CONTAMINATION

Provision, maintenance and use of monitoring instruments

53.—(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 efficacy of methods for the restriction of exposure to, and for shielding against, ionising radiations.

(2) Except as provided in paragraph (4) of this Regulation, the occupier shall ensure that there are provided and properly maintained such instruments as may be necessary to measure contamination of the surface of the body, of clothing and of personal protective equipment. Appropriate measurements shall be made at sufficiently frequent intervals to ensure that any such contamination to a level in excess of the appropriate level specified in Schedule 2 to these Regulations is detected as soon as is reasonably practicable. The name or names or designations of the person or persons authorised for the purposes of Regulation 54(1) shall be kept prominently displayed near every instrument provided in pursuance of this paragraph.

(3) Except as provided in paragraph (4) of this Regulation the occupier shall ensure that there are provided and properly maintained such instruments as may be necessary to measure contamination in any part of the premises and appropriate measurements shall be made at sufficiently frequent intervals to

ensure that any such contamination to a level in excess of the appropriate level specified in Schedule 2 to these Regulations is detected as soon as is reasonably practicable.

(4) Where the only radioactive substance in a factory is a luminising compound it shall be a sufficient compliance with the provisions of paragraphs (2) and (3) of this Regulation if the occupier provides and properly maintains an ultra violet lamp suitable for detecting any contamination by a luminising compound.

(5) The occupier shall where necessary ensure that there is provided and properly maintained an appropriate and efficient instrument by means of which appropriate measurements shall be made at such intervals as are necessary for the purpose of ascertaining the efficacy of measures for the protection of persons employed from airborne or gaseous radioactive substances.

(6) Any dosimeter, dose rate meter or other instrument provided under this Regulation may be provided for use in more than one factory.

(7) The occupier shall ensure that every such radiation dosimeter, dose rate meter and other instrument 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.

(8) All measurements under this Regulation shall be made by or under the general supervision of the competent person.

Bodily contamination

54.—(1) Whenever it is found that any part of the body of any person employed is contaminated to a level in excess of the level specified for the body in Schedule 2 to these Regulations, and that the contamination cannot be reduced by the means provided so that it does not exceed the level so specified, that person shall at once report those facts to an authorised person.

(2) Upon such facts coming to the knowledge of any authorised person, he shall notify the competent person and ensure that appropriate measures are taken to seek to reduce the contamination so that it shall not exceed the level so specified.

Contamination of personal protective equipment

55. Whenever a measurement made in accordance with Regulation 53(2) shows that any personal protective equipment deposited or about to be deposited in the accommodation provided under Regulation 38(1) is contaminated to a level in excess of the levels specified for category B in Schedule 2 to these Regulations, that equipment shall be deposited in a receptacle provided for that purpose and shall not be used until the contamination on it has been reduced so that it does not exceed the levels so specified.

Contamination of personal clothing

56. Whenever any personal clothing is found to be contaminated to a level in excess of the appropriate level specified in Schedule 2 to these Regulations it shall not be worn until the contamination on it has been reduced so that it does not exceed the level so specified.

Contamination of other surfaces

57. Whenever there is found to be contamination to a level in excess of the appropriate level specified in Schedule 2 to these Regulations (other than contamination of the body, personal protective equipment or personal clothing) immediate effective steps shall be taken to prevent dispersal of the unsealed radioactive substances causing the contamination and cleaning or other treatment shall be carried out as soon as reasonably practicable so that the contamination is reduced to a level which does not exceed the level so specified.

14th May 1968.

Barbara Castle,
Minister of Labour.

Regulations 1(1), 12(2), 17(1),
22(1), 23(1) and
(3), 29 and 30.

SCHEDULE 1

MAXIMUM PERMISSIBLE RADIATION DOSES

Application of Schedule

1. The doses specified in this Schedule 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 22(2)(a)(ii) is carried on—

- from any radioactive substance; 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 not being X-ray 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 of this Schedule, in any calendar year the maximum permissible sum of doses for persons employed in a factory from any ionising radiations shall be—

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

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

(2) Except as provided in paragraph 3 of this Schedule, 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 said doses a part of a year shall be counted as a year.

(3) If the occupier is aware that any person employed was during any period—

- in protected employment; or
- in employment which, if it had occurred after the coming into operation of any Regulations under the principal Act, would have been protected employment; or
- 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) of this paragraph, that person shall, for the purpose of calculating his total cumulative dose referred to in the said 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.

Regulations 1(1), 2(2), 3(1) and
(3), 18(1), 23(1), 38(2), 40(1)
and (7), 47(1) and (2), 51(1),
52(1), 53(2) and (3), 54(1), 55,
56 and 57.

SCHEDULE 2

MAXIMUM PERMISSIBLE LEVELS OF CONTAMINATION AND METHODS OF ASSESSMENT

1. The maximum permissible levels of contamination of surfaces (other than contamination which cannot be removed by normal methods) shall be as follows:—

Category	Surface	Maximum Permissible Level (u Ci/cm ²)		
A	Surfaces of the interiors and contents of total enclosures and fume cupboards.	The minimum that is reasonably practicable.		
B	Surfaces (other than surfaces in category A) of active areas and plant, apparatus, equipment (including personal protective equipment), materials and articles within active areas.	From alpha emitters		From emitters other than those specified in the preceding two columns
		In Class I of the Table in Schedule 3 to these Regulations	In Class II-IV of the Table in Schedule 3 to these Regulations	
		10 ⁻⁴	10 ⁻³	10 ⁻³
C	Surfaces of the body	10 ⁻⁵	10 ⁻⁵	10 ⁻⁴
D	All other surfaces	10 ⁻⁵	10 ⁻⁴	10 ⁻⁴

2. Contamination that can be rubbed off on an absorbent material shall be treated as contamination that can be removed by normal methods, and in assessing such contamination it shall be assumed (except where the fraction transferred is capable of determination) that one-tenth of the removable contamination has been transferred to the absorbent material from the area over which the material has been rubbed.

3.—(1) Where measurements of contamination are made in the case of floors, ceilings or walls over an area not exceeding one thousand square centimetres, or in the case of other surfaces (other than of the body) over an area not exceeding three hundred square centimetres, the results of the measurements may be averaged over the whole of the area measured.

(2) Where measurements of contamination are made in the case of the person (other than the hands) over an area not exceeding one hundred square centimetres, or in the case of the hands, over the whole area of the hand, the results of the measurements may be averaged over the whole of the area measured.

Regulations 1(1), 2(3) and Schedule 2

SCHEDULE 3

CLASSIFICATION OF RADIONUCLIDES

1. For the purposes of these Regulations radionuclides shall be divided into the classes set out in the Table below.

2. In this Schedule "a" indicates an alpha emitter and "m" means the metastable state.

TABLE

Class I Radionuclides (High Toxicity)

Radionuclide		Symbol
a Lead	210	Pb
a Polonium	210	Po
a Radium	223	Ra
a Radium	226	Ra
a Radium	228	Ra
a Actinium	227	Ac
a Thorium	227	Th
a Thorium	228	Th
a Thorium	230	Th
a Protoactinium	231	Pa
a Uranium	230	U
a Uranium	232	U
a Uranium	233	U
a Uranium	234	U
a Neptunium	237	Np
a Plutonium	238	Pu
a Plutonium	239	Pu
a Plutonium	240	Pu
a Plutonium	241	Pu
a Plutonium	242	Pu
a Americium	241	Am
a Americium	243	Am
a Curium	242	Cm
a Curium	243	Cm
a Curium	244	Cm
a Curium	245	Cm
a Curium	246	Cm
a Californium	249	Cf
a Californium	250	Cf
a Californium	252	Cf

Class II Radionuclides (Medium Toxicity—Upper Sub-Group A)

Radionuclide		Symbol
Sodium	22	Na
Chlorine	36	Cl
Calcium	45	Ca
Scandium	46	Sc
Manganese	54	Mn
Cobalt	56	Co
Cobalt	60	Co
Strontium	89	Sr
Strontium	90	Sr
Yttrium	91	Y
Zirconium	95	Zr
Ruthenium	106	Ru
Silver	110m	Ag
Cadmium	115m	Cd
Indium	114m	In
Antimony	124	Sb
Iodine	124	I
Antimony	125	Sb
Tellurium	127m	Te
Tellurium	129m	Te
Iodine	126	I
Iodine	131	I
Iodine	133	I
Caesium	134	Cs
Caesium	137	Cs
Barium	140	Ba
Cerium	144	Ce
Europium	152	Eu
(half-life—13 years)		
Europium	154	Eu
Terbium	160	Tb
Thulium	170	Tm
Hafnium	181	Hf
Tantalum	182	Ta
Iridium	192	Ir
Thallium	204	Tl
Bismuth	207	Bi
a Bismuth	210	Bi
a Astatine	211	At
Lead	212	Pb
a Radium	224	Ra
Actinium	228	Ac
a Protoactinium	230	Pa
Thorium	234	Th
a Uranium	236	U
a Berkelium	249	Bk

Class III Radionuclides (Medium Toxicity—Lower Sub-Group B)

Radionuclide		Symbol
Beryllium	7	Be
Carbon	14	C
Fluorine	18	F
Sodium	24	Na
Chlorine	38	Cl
Silicon	31	Si
Phosphorus	32	P
Sulphur	35	S

Class III Radionuclides (Medium Toxicity—Lower Sub-Group B)—Continued

Radionuclide		Symbol
Argon	41	A
Potassium	42	K
Potassium	43	K
Calcium	47	Ca
Scandium	47	Sc
Scandium	48	Sc
Vanadium	48	V
Chromium	51	Cr
Iron	52	Fe
Manganese	52	Mn
Manganese	56	Mn
Iron	55	Fe
Iron	59	Fe
Cobalt	57	Co
Cobalt	58	Co
Nickel	63	Ni
Nickel	65	Ni
Copper	64	Cu
Zinc	65	Zn
Zinc	69m	Zn
Gallium	72	Ga
Arsenic	73	As
Arsenic	74	As
Arsenic	76	As
Arsenic	77	As
Selenium	75	Se
Bromine	82	Br
Krypton	85m	Kr
Krypton	87	Kr
Rubidium	86	Rb
Strontium	85	Sr
Strontium	91	Sr
Strontium	92	Sr
Yttrium	90	Y
Yttrium	92	Y
Yttrium	93	Y
Zirconium	97	Zr
Niobium	93m	Nb
Niobium	95	Nb
Molybdenum	99	Mo
Technetium	96	Tc
Technetium	97m	Tc
Technetium	97	Tc
Technetium	99	Tc
Ruthenium	97	Ru
Ruthenium	103	Ru
Ruthenium	105	Ru
Rhodium	105	Rh
Palladium	103	Pd
Palladium	109	Pd
Silver	105	Ag
Silver	111	Ag
Cadmium	109	Cd
Cadmium	115	Cd
Indium	115m	In
Tin	113	Sn
Tin	125	Sn
Antimony	122	Sb
Tellurium	125m	Te

Class III Radionuclides (Medium Toxicity—Lower Sub-Group B)—Continued

Radionuclide		Symbol
Tellurium	127	Te
Tellurium	129	Te
Iodine	130	I
Tellurium	131m	Te
Tellurium	132	Te
Iodine	132	I
Iodine	134	I
Iodine	135	I
Xenon	135	Xe
Caesium	131	Cs
Caesium	136	Cs
Barium	131	Ba
Lanthanum	140	La
Cerium	141	Ce
Cerium	143	Ce
Praseodymium	142	Pr
Praseodymium	143	Pr
Neodymium	147	Nd
Neodymium	149	Nd
Promethium	147	Pm
Promethium	149	Pm
Samarium	151	Sm
Samarium	153	Sm
Europium	152	Eu
(half-life—9.2 hours)		
Europium	155	Eu
Gadolinium	153	Gd
Gadolinium	159	Gd
Dysprosium	165	Dy
Dysprosium	166	Dy
Holmium	166	Ho
Erbium	169	Er
Erbium	171	Er
Thulium	171	Tm
Ytterbium	175	Yb
Lutecium	177	Lu
Tungsten	181	W
Tungsten	185	W
Tungsten	187	W
Rhenium	183	Re
Rhenium	186	Re
Rhenium	188	Re
Osmium	185	Os
Osmium	191	Os
Osmium	193	Os
Iridium	190	Ir
Iridium	194	Ir
Platinum	191	Pt
Platinum	193	Pt
Platinum	197	Pt
Gold	196	Au
Gold	198	Au
Gold	199	Au
Mercury	197	Hg
Mercury	197m	Hg
Mercury	203	Hg
Thallium	200	Tl
Thallium	201	Tl
Thallium	202	Tl

Class III Radionuclides (Medium Toxicity—Lower Sub-Group B)—Continued

<i>Radionuclide</i>		<i>Symbol</i>
	Lead	Pb
	Bismuth	Bi
a	Bismuth	Bi
a	Radon	Rn
a	Radon	Rn
	Thorium	Th
	Protoactinium	Pa
	Neptunium	Np

Class IV Radionuclides (Low Toxicity)

<i>Radionuclides</i>		<i>Symbol</i>
	Tritium	T
	Oxygen	O
	Argon	A
	Cobalt	Co
	Nickel	Ni
	Zinc	Zn
	Germanium	Ge
	Krypton	Kr
	Strontium	Sr
	Rubidium	Rb
	Yttrium	Y
	Zirconium	Zr
	Niobium	Nb
	Technetium	Tc
	Technetium	Tc
	Rhodium	Rh
	Indium	In
	Indium	In
	Iodine	I
	Xenon	Xe
	Xenon	Xe
	Caesium	Cs
	Caesium	Cs
a	Samarium	Sm
	Rhenium	Re
	Osmium	Os
	Platinum	Pt
	Platinum	Pt
a	Thorium	Th
a	Natural Thorium	Th-Nat
a	Uranium	U
a	Uranium	U
	Natural Uranium	U-Nat
	Depleted Uranium	U-Dep
	Enriched Uranium	U-Enr

EXPLANATORY NOTE

(This Note is not part of the Regulations.)

These Regulations impose requirements for the protection of persons employed in factories and other places to which the Factories Act 1961 applies, against ionising radiations arising from unsealed radioactive substances and from objects contaminated with unsealed radioactive substances.

STATUTORY INSTRUMENTS

1968 No. 780

FACTORIES

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