

Subsidiary Legislation made under s.2.

**Ionising Radiation Regulations 2004****LN.2004/088**

		<i>Commencement</i>	<b>13.9.2004</b>
Amending enactments	Relevant current provisions		Commencement date
LN. 2007/005	rr. 6(1)(d)-(e), 56-63, Schs.9-10		18.1.2007
Act. 2016-20	r. 43(2)		13.10.2016
LN. 2018/024	rr. 2, 3(1)(b), (2)-(3), (5)(c), 3A, 4A-4C, 5-6, 6A, 7(1), (1A), (2), (5), (8), 9(2)(c), (4A), (5)(b), 12(2)-(5), 13(a)(ii), (b)-(c), 14(5), 15, 16A-16F, 17(1)(b), 18(b), 19(1A), (4A), 20(6)(b)-(c), 21(1A), (4), 21A, 22(1), 23(3), (4)(h), 25(1), (2)(a)-(c), 26(1)(c), (3)(b), (6), (6A), 27(4)(b)(ii), 32(1), (1A), (2), (4)(b), 33, 34(3), (5), (6)(b)(ii), 37(4)-(5), 38(2)(d), 39(7), 46(1)-(2), (6), 51, (3)-(4), (4A), (6)-(7), (7A), (8), 53(1)-(2), (2A), (3)-(9), 55-62, Sch. 1, 1A, 4-18		6.2.2018

**Transposing:**

Directive 2013/59/EURATOM

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## Health Protection (Ionising Radiation)

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*In exercise of the powers conferred upon it by section 2 of the Health Protection (Ionising Radiation) Act 1995, and section 23 of the Interpretation and General Clauses Act and of all other enabling powers, and for the purpose of implementing in the law of Gibraltar Council Directives 90/641/Euratom, 96/29/Euratom and 97/43/Euratom, the Government has made the following Regulations—*

#### **PART I PRELIMINARY**

##### **Citation and commencement.**

1. These Regulations may be cited as the Ionising Radiation Regulations 2004 and come into operation on the 13 September 2004.

##### **Interpretation.**

2.(1) In these Regulations, unless the context otherwise requires—

“absorbed dose” means  $D$  as in energy absorbed per unit mass, as—

$$D = \frac{d\bar{\epsilon}}{dm},$$

where—

$d\bar{\epsilon}$  is the mean energy imparted by ionising radiation to the matter in a volume element;

$dm$  is the mass of the matter in this volume element,

and in these Regulations, absorbed dose denotes the dose averaged over a tissue or an organ, with the unit for absorbed dose being the gray (Gy) where one gray is equal to one joule per kg;

“accelerator” means an apparatus or installation in which particles are accelerated and which emits ionising radiation with an energy higher than 1MeV;

“accidental exposure” means an exposure of individuals, other than emergency workers, as a result of an accident;

“activation” means a process through which a stable nuclide is transformed into a radionuclide by irradiating with particles or high-energy photons the material in which it is contained;

“activity” means  $A$  as in the activity of an amount of a radionuclide in a particular energy state at a given time: where it is the quotient of  $dN$  by  $dt$ , where  $dN$  is the expectation value of the number of nuclear transitions from that energy state in the time interval  $dt$ , expressed by-

$$A = \frac{dN}{dt},$$

where the unit of activity is the Becquerel.

“appointed doctor” means a registered medical practitioner who is for the time being appointed in writing by the competent authority, for the purposes of these Regulations;

“apprentice” means a person receiving training or instruction within an undertaking with a view to exercising a specific skill;

“approved” means approved for the time being in writing for the purposes of these Regulations by the competent authority and published in such form as the authority considers appropriate;

“approved dosimetry service” means a body or an individual, approved in accordance with regulation 37, as being competent to calibrate, read or interpret individual monitoring devices, or to measure radioactivity in the human body or in biological samples, or to assess doses;

“authorisation” means an authorisation granted under regulation 6A;

“Bq” means Becquerel, which is the special name of the unit of activity, and one Becquerel is equivalent to one nuclear transition per second;

“building material” means any construction product for incorporation in a permanent manner in a building or parts thereof and the performance of which has an effect on the performance of the building with regard to exposure of its occupants to ionising radiation;

“calendar year” means a period of 12 calendar months beginning with the 1<sup>st</sup> January;

“classified person” means-

- (a) a person designated as such, pursuant to regulation 22(1); and
- (b) in the case of an outside worker employed by an undertaking in Great Britain, Northern Ireland or in a Member State, a person who has been designated as a Category A exposed worker within the meaning of Article 40 of the Directive;

“clearance levels” means values established by the competent authority or in Gibraltar law, and expressed in terms of activity concentrations, at or below which materials arising from any practice subject to notification or authorisation may be released from the requirements of the Directive;

“comforter and carer” means an individual who (other than as part of his occupation) knowingly and willingly incurs an exposure to ionising radiation resulting from the support and comfort of another person who is undergoing or who has undergone any medical exposure;

“committed effective dose” means  $E(\tau)$  as the sum of the committed organ or tissue equivalent doses  $HT(\tau)$  resulting from an intake, each multiplied by the appropriate tissue weighting factor  $w_T$ : and it is expressed by-

$$E(\tau) = \sum_T w_T HT(\tau)$$

, and

in specifying  $E(\tau)$ , is given in the number of years over which the integration is made, and for the purposes of complying with dose limits under these Regulations is-

- (a) a period of 50 years following intake for adults; and
- (b) up to the age of 70 for infants and children,

where the unit for committed effective dose is the Sievert;

“committed equivalent dose” means  $HT(\tau)$  as the integral over time ( $t$ ) of the equivalent dose rate in tissue or organ  $T$  that will be received by an individual as a result of an intake, and is expressed by-

$$HT(\tau) = \int_{t_0}^{t_0+\tau} \dot{H}_T(t) dt$$

,

for an intake at time  $t_0$  where-



$H_T(t)$  is the relevant equivalent dose rate in organ or tissue T at time t; and

$\tau$  is the time over which the integration is performed,

and in specifying  $H_T(\tau)$ , is given in number of years over which the integration is made, and for the purposes of complying with dose limits under these Regulations is-

- (a)  $\tau$  is a period of 50 years for adults; and
- (b) up to the age of 70 for infants and children,

where the unit for committed effective dose is the Sievert;

“competent authority” means the person appointed in writing (by notice in the Gazette) by the Minister, for the purposes of these Regulations;

“consumer product” means a device or manufactured item into which one or more radionuclides have deliberately been incorporated or produced by activation or which generates ionising radiation, and which can be sold or made available to members of the public without special surveillance or regulatory control after sale;

“contamination” means the unintended and undesirable presence of radioactive substances on surfaces or within solids, liquids or gases or on the human body, and “contaminated” is to be construed accordingly;

“controlled area” means-

- (a) in the case of an area situated in Gibraltar, an area which has been so designated in accordance with regulation 17(1); and
- (b) in the case of an area situated in Great Britain, Northern Ireland or in a Member State, an area subject to special rules for the purposes of protection against ionising radiation and to which access is controlled as specified in Article 37 of the Directive;

“the Directive” means Council Directive 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom;

“diagnostic reference levels” means dose levels in medical radiodiagnostic or interventional radiology practices, or, in the case of radio-pharmaceuticals, levels of activity, for

typical examinations for groups of standard-sized patients or standard phantoms for broadly defined types of equipment;

“disused source” means a sealed source which is no longer used or intended to be used for the practice for which authorisation was granted but continues to require safe management;

“dose” means, in relation to ionising radiation, any dose quantity or sum of dose quantities mentioned in Schedule 4;

“dose assessment” means the dose assessment made and recorded by an approved dosimetry service in accordance with regulation 23;

“dose constraint” means a constraint set as a prospective upper bound of individual doses, used to define the range of options considered in the process of optimisation for a given radiation source in a planned exposure situation;

“dose limit” means, in relation to persons of a specified class, the limit on effective dose or equivalent dose specified in Schedule 4 in relation to a person of that class;

“dose rate” means, in relation to a place, the rate at which a person or part of a person would receive a dose of ionising radiation from external radiation if he were at that place being a dose rate at that place averaged over one minute;

“dose record” means, in relation to a person, the record of the doses received by that person as a result of his exposure to ionising radiation, being the record made and maintained on behalf of the employer by the approved dosimetry service in accordance with regulation 23;

“effective dose” means the sum of the weighted equivalent doses in all the tissues and organs of the body from internal and external exposure, and is defined by the expression-

$$E = \sum_T w_T H_T$$

and further defined in Schedule 11;

“emergency” means a non-routine situation or event involving a radiation source that necessitates prompt action to mitigate serious adverse consequences for human health and safety, quality of life, property or the environment, or a hazard that could give rise to such serious adverse consequences;

“emergency worker” means a person, either self-employed or working under an employer, who is subject to exposure at work carried out within a practice regulated by these Regulations and who is liable to receive doses exceeding one or other of the dose limits for public exposure;

“environmental monitoring” means the measurement of external dose rates due to radioactive substances in the environment or of concentrations of radionuclides in environmental media;

“equivalent dose” means the absorbed dose, in tissue or organ T weighted for the type and quality of radiation R, and is defined by the expression-

$$H_T = \sum R_i D_{T,i}$$

and further defined in Schedule 11;

“existing exposure situation” means an exposure situation that already exists when a decision on its control has to be taken and which does not call or no longer calls for urgent measures to be taken;

“exposure” means the act of exposing or condition of being exposed to ionising radiation emitted outside the body (external exposure) or within the body (internal exposure);

“external radiation” means, in relation to a person, ionising radiation coming from outside the body of that person;

“extremities” means a person’s hands, forearms, feet and ankles;

“health detriment” means reduction in length and quality of life occurring in a population following exposure, including those arising from tissue reactions, cancer and severe genetic disorder;

“health record” means, in relation to an employee, the record of medical surveillance of that employee maintained by the employer in accordance with regulation 26(3);

“high-activity sealed source” means a sealed source for which the activity of the radionuclide is equal to or exceeds the relevant activity value set out in Schedule 9;

“industrial irradiation” means the use of ionising radiation to sterilise, process or alter the structure of products or materials;

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“industrial radiography” means the use of ionising radiation for non-destructive testing purposes where an image of the item under test is formed, but excluding any such testing which is carried out in a cabinet which a person cannot enter;

“intake” means the total activity of a radionuclide entering the body from the external environment;

“internal radiation” means, in relation to a person, ionising radiation coming from inside the body of that person;

“International Headquarters and Defence Organisations Act 1964” means the International Headquarters and Defence Organisations Act 1964 passed by the Parliament at Westminster;

“ionising radiation” means the transfer of energy in the form of particles or electromagnetic waves of a wavelength of 100 nanometres or less or a frequency of  $3 \times 10^{15}$  hertz or more capable of producing ions directly or indirectly;

“local rules” means rules made in accordance with regulation 19(1);

“maintained”, where the reference is to maintaining plant, apparatus, equipment or facilities, means maintained in an efficient state, in efficient working order and good repair;

“medical exposure” means exposure of a person to ionising radiation for the purpose of his medical or dental examination or treatment which is conducted under the direction of a suitably qualified person and includes any such examination for legal purposes and any such examination or treatment conducted for the purposes of research;

“medical exposure” means exposure incurred by patients or asymptomatic individuals as part of their own medical or dental diagnosis or treatment, and intended to benefit their health, as well as exposure incurred by carers and comforters and by volunteers in medical or biomedical research;

“medical physics expert” means a person who holds a science degree or its equivalent and who is experienced to act or give evidence in the application of physics to the diagnostic and therapeutic uses of ionising radiation;

“medical radiological” means pertaining to radiodiagnostic and radiotherapeutic procedures, and interventional radiology or other medical uses of ionising radiation for planning, guiding and verification purposes;

“Member State” means a Member State of the European Union;

- “members of the public” means individuals who may be subject to public exposure;
- “the Minister” means the Minister with responsibility for the Environment;
- “non-medical imaging exposure” means any deliberate exposure of humans for imaging purposes where the primary intention of the exposure is not to bring a health benefit to the individual being exposed;
- “occupational exposure” means a health professional or body competent to perform medical surveillance of exposed workers and whose capacity to act in that respect is recognised by the competent authority;
- “orphan source” means a radioactive source which is neither exempted nor under regulatory control, either because it has never been under regulatory control or because it has been abandoned, lost, misplaced, stolen or otherwise transferred without proper authorisation;
- “outside worker” means a classified person who carries out services in the controlled area of any employer (other than the controlled area of his own employer);
- “overexposure” means any exposure of a person to ionising radiation to the extent that the dose received by that person causes a dose limit relevant to that person to be exceeded or, in relation to regulation 28(2) causes a proportion of a dose limit relevant to any employee to be exceeded;
- “planned exposure situation” means an exposure situation that arises from the planned operation of a radiation source or from a human activity which alters exposure pathways, so as to cause the exposure or potential exposure of people or the environment: and planned exposure situations may include both normal exposures and potential exposures;
- “potential exposure” means exposure that is not expected with certainty but may result from an event or sequence of events of a probabilistic nature, including equipment failures and operating errors;
- “practice” means work involving-
- (a) the production, processing, handling, use, holding, storage, transport or disposal of radioactive substances; or
  - (b) the operation of any electrical equipment emitting ionising radiation and containing components operating at a potential difference of more than 5kV,

which can increase the exposure of individuals to ionising radiation;

“processing” means chemical or physical operations on radioactive material including the mining, conversion, enrichment of fissile or fertile nuclear material and the reprocessing of spent fuel;

“protective measures” means measures, other than remedial measures, for the purpose of avoiding or reducing doses that might otherwise be received in an emergency exposure situation or an existing exposure situation;

“public exposure” means exposure of individuals, excluding any occupational or medical exposure;

“quality assurance” means all those planned and systematic actions necessary to provide adequate assurance that a structure, system, component or procedure will perform satisfactorily in compliance with agreed standards: and quality control is a part of quality assurance; “radiation accident” means an accident where immediate action would be required to prevent or reduce the exposure to ionising radiation of employees or any other persons;

“radiation employer” means an employer who in the course of a trade, business or other undertaking carries out work with ionising radiation and, for the purposes of regulations 6, 6A, 7 and 8, includes an employer who intends to carry out such work;

“radiation generator” means a device capable of generating ionising radiation, such as x-rays, neutrons, electrons or other charged particles;

“radiation passbook” means—

- (a) in the case of an outside worker employed by an employer in Gibraltar—
  - (i) a passbook approved by the competent authority for the purpose of these Regulations; or
  - (ii) a passbook to which regulation 53(4) (which is a transitional provision) applies; and
- (b) in the case of an outside worker employed by an employer in Great Britain, Northern Ireland or in a Member State, a passbook authorised by the competent authority for Great Britain, Northern Ireland or that a Member State, as the case may be;

“radiation protection adviser” means, subject to regulation 52(6) (which is a transitional provision), an individual who, or a body which, meets such criteria of competence as may from time to time be specified in writing by the competent authority;

“radiation source” means an entity that may cause exposure, such as by emitting ionising radiation or by releasing radioactive material;

“radioactive material” means material incorporating radioactive substances;

“radioactive source” means a radiation source incorporating radioactive material for the purpose of utilising its radioactivity;

“radioactive substance” means any substance which contains one or more radionuclides whose activity cannot be disregarded for the purposes of radiation protection;

“radioactive waste” means radioactive material in gaseous, liquid or solid form for which no further use is foreseen or considered, and which is regulated as radioactive waste by a competent authority;

“reference level” means, in an emergency exposure situation or in an existing exposure situation, the level of effective dose or equivalent dose or activity concentration above which it is judged inappropriate to allow exposures to occur as a result of that exposure situation, even though it is a limit that may be exceeded;

“remedial measures” means the removal of a radiation source or the reduction of its magnitude, in terms of activity or amount, or the interruption of exposure pathways or the reduction of their impact for the purposes of avoiding or reducing doses that might otherwise be received in an existing exposure situation;

“representative person” means an individual receiving a dose that is representative of the more highly exposed individuals in the population, excluding those individuals having extreme or rare habits;

“sealed source” means a radioactive source in which the radioactive material is permanently sealed in a capsule or incorporated in a solid form with the objective of preventing, under normal conditions of use, any dispersion of radioactive substances;

“Secretary of State” means Her Majesty’s Secretary of State for Defence;

“short-lived daughters of radon 222” means polonium 218, lead 214, bismuth 214 and polonium 214;

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“sievert” or “Sv” means the special name of the unit of equivalent or effective dose, and one sievert is equivalent to one joule per kilogram;

“storage” means the holding of radioactive material, including spent fuel, a radioactive source or radioactive waste, in a facility with the intention of retrieval;

“source container” means an assembly of components intended to guarantee the containment of a sealed source, where it is not an integral part of the source but is meant for shielding the source during its transport and handling;

“standard values and relationships” means values and relationships recommended in chapters 4 and 5 of ICRP Publication 116 for the estimation of doses from external exposure and chapter 1 of ICRP Publication 119 for the estimation of doses from internal exposure, including updates approved by Member States;

“supervised area” means an area which has been so designated by the employer in accordance with regulation 18;

“trainee” means a person aged 16 years or over (including a student) who is undergoing instruction or training which involves operations which would, in the case of an employee, be work with ionising radiation;

“transport” means, in relation to a radioactive substance, carriage of that substance on a road within the meaning of section 2(1) of the Traffic Act or through another public place (whether on a conveyance or not), or by sea or air and, in the case of transport on a conveyance, a substance shall be deemed as being transported from the time that it is loaded onto the conveyance for the purpose of transporting it until it is unloaded from that conveyance, but a substance shall not be considered as being transported if-

- (a) it is transported by means of a pipeline or similar means; or
- (b) it forms an integral part of a conveyance and is used in connection with the operation of that conveyance;

“Visiting Forces Act 1952” means the Visiting Forces Act 1952 passed by the Parliament at Westminster;

“work with ionising radiation” means work to which these Regulations apply by virtue of regulation 3(1).

(2) In these Regulations, unless the context otherwise requires, any reference to-



- (a) an employer includes a reference to a self-employed person and any duty imposed by these Regulations on an employer in respect of his employee shall extend to a self-employed person in respect of himself;
  - (b) an employee includes a reference to-
    - (i) a self-employed person, and
    - (ii) a trainee who but for the operation of this paragraph and subregulation (3) would not be classed as an employee;
  - (c) exposure to ionising radiation is a reference to exposure to ionising radiation arising from work with ionising radiation;
  - (d) a person entering, remaining in or working in a controlled or supervised area includes a reference to any part of a person entering, remaining in or working in any such area.
- (3) For the purposes of these Regulations-
- (a) the word “work” shall include any instruction or training which a person undergoes as a trainee and the meaning of “at work” shall be construed accordingly; and
  - (b) a trainee shall, while he is undergoing instruction or training in respect of work with ionising radiation, be treated as the employee of the person whose undertaking (whether for profit or not) is providing that instruction or training and that person shall be treated as the employer of that trainee except that the duties to the trainee imposed upon the person providing instruction or training shall only extend to matters under the control of that person.
- (4) In these Regulations, where reference is made to a quantity specified in Schedule 8, that quantity shall be treated as being exceeded if-
- (a) where only one radionuclide is involved, the quantity of that radionuclide exceeds the quantity specified in the appropriate entry in Schedule 8; or
  - (b) where more than one radionuclide is involved, the quantity ratio calculated in accordance with Part II of Schedule 8 exceeds one.
- (5) Nothing in these Regulations shall be construed as preventing a person from entering or remaining in a controlled area or a supervised area where that person enters or remains in any such area-

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- (a) in the due exercise of a power of entry conferred on him by or under any enactment; or
  - (b) for the purpose of undergoing a medical exposure.
- (6) In these Regulations-
- (a) any reference to an effective dose means the sum of the effective dose to the whole body from external radiation and the committed effective dose from internal radiation; and
  - (b) any reference to equivalent dose to a human tissue or organ includes the committed equivalent dose to that tissue or organ from internal radiation.

#### **Application.**

3.(1) These Regulations shall apply to-

- (a) any practice;
  - (b) any work, other than a practice, carried out in an atmosphere containing radon 222 gas at an annual average activity concentration in air exceeding 300 Bq m<sup>-3</sup>; and
  - (c) any work (other than work referred to in paragraphs (a) and (b)) with any radioactive substance containing naturally occurring radionuclides.
- (2) The following regulations shall not apply where the only work being undertaken is that referred to in paragraph (b) of subregulation (1), namely regulations 25, 29 to 32, 34 and 35.
- (3) The following regulations shall not apply in relation to a person undergoing a medical exposure, namely regulations 8, 9, 12, 17 to 20, 25, 27, 33(2)(a) and 36(1).
- (4) Regulation 12 (dose limitation) shall not apply in relation to any comforter and carer.
- (5) In the case of an outside worker (working in a controlled area in Gibraltar) employed by an employer established in Great Britain, Northern Ireland or in a Member State it shall be sufficient compliance with regulation 23 (dose assessment and recording) and regulation 26 (medical surveillance) if the employer complies with-
- (a) where the employer is established in Great Britain, regulations 21 and 24 of the Ionising Radiation Regulations 2017;

- (b) where the employer is established in Northern Ireland, regulations 21 and 24 of the Ionising Radiation (Northern Ireland) Regulations 2000; or
- (c) where the employer is established in a Member State, the legislation in that Member State which implements Chapter VI of the Directive, where such legislation exists.

**Setting of reference levels.**

3A.(1) When setting a reference level for the purposes of these Regulations, consideration shall be given to-

- (a) radiological protection requirements and societal criteria; and
- (b) the range of reference levels set out in Annex I to the Directive.

(2) Where a reference level has been set for an exposure situation, optimisation of radiation protection for individuals subject to the exposure shall be prioritised for exposures above the reference level, and optimisation shall be implemented below the reference level.

**Duties under the Regulations.**

4. Any duty imposed by these Regulations upon an employer in respect of the exposure to ionising radiation of persons other than his employees shall be imposed only in so far as the exposure of those persons to ionising radiation arises from work with ionising radiation undertaken by that employer.

**PART IA**

**JUSTIFICATION AND REGULATORY CONTROL OF PRACTICES**

**Justification of types of practice.**

4A.(1) No person shall carry out any practice resulting in exposure to ionising radiation which falls within a new class or type of practice unless the Minister has determined in writing that that new class or type of practice is justified by its economic, social or other benefits in relation to the health detriment it may cause.

- (2) Whenever there is-
  - (a) new and important evidence as to the efficacy or consequences of an existing class or type of practice; or

- (b) new and important information about other techniques and technologies,
- the Minister may review that class or type of practice in order to determine whether it is justified by its economic, social or other benefits in relation to the health detriment it may cause.
- (3) A class or type of practice involving occupational and public exposures is to be justified taking into account both categories of exposure, and the identification of classes or types of practices involving naturally-occurring radioactive material shall be carried out by appropriate means taking into account the industrial sectors listed in Schedule 12.
- (4) Where, pursuant to subregulation (2), the Minister determines that an existing class or type of practice is not justified, he shall prohibit in writing the carrying on of that class or type of practice and, subject to subregulation (5), thereafter no person shall carry on any practice which falls within that class or type of practice.
- (5) The Minister may make any prohibition pursuant to subregulation (4) subject to such incidental or transitional provisions as he considers appropriate.
- (6) The Minister shall take such steps as he considers appropriate to make public-
- (a) any determination made pursuant to subregulation (1) or (2); or
  - (b) any prohibition made pursuant to subregulation (4).
- (7) Prior to determining whether a new or existing class or type of practice is justified pursuant to subregulation (1) or (2), the Minister shall consult-
- (a) the competent authority;
  - (b) where the class or type of practice involves work with any radioactive substance, the Environmental Agency; and
  - (c) any other person or body which the Minister considers appropriate.
- (8) Where, having consulted others pursuant to subregulation (7), the Minister is of the opinion that the new or existing class or type of practice may not be justified, he shall-
- (a) afford the person seeking the determination an opportunity to make representations to him before making any determination pursuant to subregulation (1) or (2); and

- (b) take such steps as it considers appropriate to bring the proposed prohibition to the attention of any person who is carrying on a practice of such class or type and who may be directly affected by that prohibition.
- (9) Notwithstanding the provisions of subregulations (1) and (4), the deliberate addition of any radioactive substance in the production of any of the following shall be prohibited-
- (a) any toy;
  - (b) any personal ornament; and
  - (c) any cosmetic.
- (10) In this regulation, “new class or type of practice” means a class or type of practice for which-
- (a) no practice in that class or type was carried out in Gibraltar before 6 February 2018; or
  - (b) a practice in that class or type was carried out in Gibraltar before 6 February 2018 but in breach of a requirement not to carry out such practice,
- and in either case the class or type of practice has not been found to be justified.
- (11) Proceedings for an offence under this regulation shall not be instituted without the consent of the Attorney General.
- (12) Nothing in subregulation (1) or (4) shall prevent, in relation to a medical exposure, the administering of a specific individual exposure to ionising radiation permitted by the Ionising Radiation (Administration of Radioactive Medicinal Products and Medical Exposures) Regulations 2002.
- (13) This Regulation does not apply to activities on board, or related to, visiting nuclear powered warships.
- (14) Any justification decision made by the Minister under this regulation may be made subject to such conditions as the Minister may consider appropriate.
- (15) Where the Secretary of State determines that, for overriding reasons of national security, it is necessary for any function under this regulation to be exercised by the Secretary of State, any reference to the Minister in this Regulation shall be construed as a reference to the Secretary of State.

**Practices involving consumer products.**

4B.(1) Any person intending to manufacture or import a consumer product for which the intended use is likely to be a new class or type of practice shall, prior to commencing the manufacture or import, provide the Minister with all the relevant information necessary to make a determination for justification, including-

- (a) the intended use of the product;
- (b) the technical characterisations of the product;
- (c) in the case of products containing radioactive substances, information as to their means of fixation;
- (d) dose rates at relevant distances for the use of the product, including dose rates at a distance of 0.1m from any accessible surface; and
- (e) expected doses to regular users of the product.

(2) In deciding whether the intended use of the consumer product is justified the Minister shall take into account whether-

- (a) the performance of the consumer product justifies its intended use;
- (b) the design is adequate in order to minimise exposures in normal use and the likelihood and consequences of misuse or accidental exposures, or whether there should be conditions imposed on the technical and physical characteristics of the product;
- (c) the product is adequately designed to meet the exemption criteria, and, where applicable, is of an approved type and does not necessitate specific precautions for disposal when no longer in use; and
- (d) the product is appropriately labelled and suitable documentation is provided to the consumer with instructions for proper use and disposal.

(3) Without prejudice to subregulation (1) the Minister shall ensure that the competent authority and competent authorities of Member States are-

- (a) informed of any contact made by a person intending to manufacture or import a consumer product under subregulation (1); and
- (b) informed, upon request, of the Minister's decision and basis for that decision.

- (4) No person shall knowingly or recklessly-
- (a) add any radioactive substance in the production of foodstuffs, animal feeding stuffs, and cosmetics;
  - (b) add any radioactive substance in the manufacture of toys and personal ornaments;
  - (c) manufacture, sell, or make available to the public any toys or personal ornaments, the intended use of which involves the activation of materials, where that activation results-
    - (i) at the time of sale of the product, or
    - (ii) at the time of their manufacture,

in an increase in activity which cannot be disregarded from a radiation protection point of view; or

- (d) import or export any of the products in paragraphs (a) to (c).

(5) A class or type of practice involving activation of material resulting in an increase in activity in a consumer product, which at the time of sale of that consumer product, cannot be disregarded from a radiation protection point of view, is “new” for the purposes of this Part if that class or type of practice has not been found to be justified.

(6) The sale or the making available to the public of consumer products, if their intended use is not justified or their use would not fulfil the criteria for exemption from notification under Schedule 1, is prohibited.

**Practices involving non-medical imaging exposure.**

4C.(1) The Minister shall ensure that practices involving non-medical imaging exposure are identified, in particular taking into account the following practices-

- (a) practices using medical radiological equipment for-
  - (i) radiological health assessment for employment purposes,
  - (ii) radiological health assessment for immigration purposes,
  - (iii) radiological health assessment for insurance purposes,

- (iv) radiological evaluation of the physical development of children and adolescents with a view to a career in sports, dancing, etc.,
- (v) radiological age assessment,
- (vi) use of ionising radiation for the identification of concealed objects within the human body.

(b) practices not using medical radiological equipment for-

- (i) use of ionising radiation for detection of concealed objects on or attached to the human body,
- (ii) use of ionising radiation for detection of concealed humans as part of cargo screening,
- (iii) practices involving the use of ionising radiation for legal or security purposes.

(2) Special attention shall be given to the justification of practices involving non-medical imaging exposure, in particular-

- (a) all types of practices involving non-medical imaging exposure shall be justified before being generally accepted;
- (b) each particular application of a generally accepted type of practice shall be justified;
- (c) all individual non-medical imaging exposure procedures using medical radiological equipment shall be justified in advance, taking into account the specific objectives of the procedure and the characteristics of the individual involved;
- (d) the general and particular justification of practices involving non-medical imaging exposure, as specified in paragraphs (a) and (b), may be subject to review;
- (e) circumstances warranting non-medical imaging exposures, without individual justification of each exposure, shall be subject to regular review.

(3) The Minister may exempt justified practices involving non-medical imaging exposure using medical radiological equipment from the requirement for dose constraints, and from the dose limits set out in regulation 12.



(4) Where the Minister has justified a particular practice involving non-medical imaging exposure, the competent authority shall ensure that-

- (a) the practice is subject to authorisation;
- (b) requirements for the practice, including criteria for individual implementation, are established by the competent authority, in cooperation with other relevant bodies and medical scientific societies, as appropriate;
- (c) for procedures using medical radiological equipment-
  - (i) relevant requirements identified for medical exposure as set out in the Ionising Radiation (Administration of Radioactive Medicinal Products and Medical Exposures) Regulations 2002 are applied, including those for equipment, optimisation, responsibilities, training and special protection during pregnancy and the appropriate involvement of the medical physics expert,
  - (ii) where appropriate, specific protocols, consistent with the objective of the exposure and required image quality, are put in place,
  - (iii) where practicable, specific diagnostic reference levels are put in place;
- (d) for procedures not using medical radiological equipment, dose constraints are significantly below the dose limit for members of the public;
- (e) information is provided to and consent sought from the individual to be exposed, allowing for cases where the law enforcement authorities may proceed without consent of the individual according to Gibraltar law.

## PART II

### GENERAL PRINCIPLES AND PROCEDURES

5. *Deleted.*

#### **Registration of certain practices.**

6.(1) Subject to subregulation (3), an employer shall not carry out any of the practices listed in subregulation (2) "registrable practices" unless-

- (a) he has registered the practice in accordance with the registration procedure approved by the competent authority from time to time;

- (b) he provides to the competent authority any such additional particulars in relation to the practice as the competent authority may reasonably require in connection with the registration.
- (2) The following are registrable practices-
- (a) the operation of radiation generators or accelerators or radioactive sources for medical exposures or for non-medical imaging; and
  - (b) any other work involving ionising radiation, which is not a specified practice under regulation 6A.
- (3) Registration by the competent authority under subregulation (1)(a) may be granted in accordance with such conditions, with or without limit of time, as the competent authority may impose in connection with the registration.
- (4) Registration may be refused or revoked at any time by the competent authority if it reasonably believes that-
- (a) harm is being caused to employees or the public; or
  - (b) conditions imposed on the registration are not being upheld.
- (5) Where an employer subsequently ceases to carry out, or makes a material change, to a practice that he has registered under subregulation (1)(a), which would affect the particulars relating to the registration as to no longer make it accurate, the employer shall notify the competent authority, as soon as practically possible, of that cessation or material change.
- (6) An employer who is aggrieved by-
- (a) a refusal to register;
  - (b) any conditions imposed on registration;
  - (c) any limit of time imposed on registration; or
  - (d) the revocation of registration,
- may appeal, in writing, to the Minister with 28 days of the decision to refuse, revoke, or impose a limit of time or conditions on the registration.

(7) The Minister may, in such cases as he considers it appropriate to do so, having regard to the nature of the questions which appear to him to arise, direct that an appeal under this regulation shall be determined on his behalf by a person appointed by him for that purpose.

(8) Before the determination of an appeal the Minister shall ask the appellant and the competent authority whether they wish to appear and be heard on the appeal and-

- (a) the appeal may be determined without a hearing of the parties if both of them express a wish not to be heard as aforesaid;
- (b) the Minister shall, if either of the parties expresses a wish to appear and be heard, afford both to both of them an opportunity of so doing.

(9) The person who determines an appeal under this regulation (whether it be the Minister himself or another person appointed by him to do so on his behalf) may give such directions as he considers appropriate to give effect to his determination.

(10) The Minister may pay to any person appointed to hear or determine an appeal under this regulation on his behalf such remuneration and allowances as the Minister may determine.

**Authorisation of specified practices.**

6A.(1) Except in accordance with a prior written authorisation granted by the competent authority, an employer shall not carry out any of the following practices "specified practice"-

- (a) the deliberate administration of radioactive substances to persons and, in so far as the radiation protection of human beings is concerned, animals for the purpose of medical or veterinary diagnosis, treatment or research;
- (b) the operation, except aboard a visiting nuclear powered warship, and decommissioning of any nuclear facility and the exploitation and closure of uranium mines;
- (c) the deliberate addition of radioactive substances in the production or manufacture of consumer products or other products, including medicinal products, and the import of such products;
- (d) any practice involving a high-activity sealed source, other than one within paragraphs (h) or (i);
- (e) the operation, decommissioning and closure of any facility for the long term storage or disposal of radioactive waste, including facilities managing radioactive waste for this purpose;

- (f) practices discharging significant amounts of radioactive material with airborne or liquid effluent into the environment;
- (g) the operation of radiation generators or accelerators, except electron microscopes, or radioactive sources for purposes not covered by regulation 6(2)(a);
- (h) industrial irradiation;
- (i) industrial radiography;
- (j) the disposal, recycling or reuse of radioactive substances or materials arising from any practice referred to in paragraphs (a) to (g).

(2) An employer wanting to carry out a specified practice under subregulation (1) shall apply in writing for authorisation, in accordance with the authorisation procedure approved by the competent authority from time to time.

(3) An employer applying for authorisation under subregulation (2) shall provide-

- (a) such of the information set out in Schedule 1A as the competent authority may specify from time to time as necessary to determine the application for authorisation;
- (b) upon notice in writing, such other information relating to the practice as the competent authority may reasonably require in connection with the application for authorisation.

(4) Authorisation by the competent authority under this regulation may be granted in accordance with such conditions, with or without limit of time, as the competent authority may impose in connection with the authorisation.

(5) Authorisation may be refused or revoked at any time by the competent authority if it reasonably believes that-

- (a) harm is being caused to employees or the public; or
- (b) conditions imposed on the authorisation are not being upheld.

(6) Where an employer subsequently ceases to carry out, or makes a material change, to a practice that he has received authorisation for, which would affect the particulars relating to the authorisation as to no longer make it accurate, the employer shall notify the competent authority, as soon as practically possible, of that cessation or material change.

(7) An employer who is aggrieved by-

- (a) a refusal for authorisation;
- (b) any conditions imposed on an authorisation;
- (c) any limit of time imposed on an authorisation; or
- (d) the revocation of an authorisation,

may appeal, in writing, to the Minister with 28 days of the decision to refuse, revoke, or impose a limit of time or conditions on the authorisation.

(8) The Minister may, in such cases as he considers it appropriate to do so, having regard to the nature of the questions which appear to him to arise, direct that an appeal under this regulation shall be determined on his behalf by a person appointed by him for that purpose.

(9) Before the determination of an appeal the Minister shall ask the appellant and the competent authority whether they wish to appear and be heard on the appeal and-

- (a) the appeal may be determined without a hearing of the parties if both of them express a wish not to be heard as aforesaid;
- (b) the Minister shall, if either of the parties expresses a wish to appear and be heard, afford both of them an opportunity of so doing.

(10) The person who determines an appeal under this regulation, whether it be the Minister himself or another person appointed by him to do so on his behalf, may give such directions as he considers appropriate to give effect to his determination.

(11) The Minister may pay to any person appointed to hear or determine an appeal under this regulation on his behalf such remuneration and allowances as the Minister may determine.

(12) Subject to subregulation (13), materials for the disposal, recycling or reuse may be released from the need for authorisation by the competent authority provided that the activity concentrations-

- (a) for solid material do not exceed the clearance levels set out in Table A of Annex VII to the Directive; or

- (b) comply with specific clearance levels, established by the competent authority, and associated requirements for specific materials or for materials originating from specific types of practices.

(13) If clearance levels are set under subregulation (12)(b), consideration shall be had of the general exemption and clearance criteria set out in Schedule 1 and any available technical guidance.

(14) The clearance levels set by the competent authority for materials containing naturally-occurring radionuclides, where these result from authorised practices in which natural radionuclides are processed for their radioactive, fissile or fertile properties, shall comply with the dose criteria for clearance of materials containing artificial radionuclides.

(15) Subject to subregulation (16), the deliberate dilution of radioactive materials for the purpose of releasing them from regulatory control in accordance with subregulation (12) shall not be allowed by the competent authority.

(16) The mixing of materials that takes place in normal operations where radioactivity is not a consideration is not subject to the prohibition under subregulation (15).

(17) The competent authority may authorise, in specific circumstances, the mixing of radioactive and non-radioactive materials for the purposes of reuse or recycling.

**Notification of specified work.**

7.(1) This regulation shall apply to work with ionising radiation other than-

- (a) work arising from the carrying out of a registrable practice under regulation 6 or a specified practice requiring authorisation under regulation 6A;
- (b) work specified in Schedule 1.

(1A) Notwithstanding any exemption from notification that may be provided under these Regulations, where a practice may lead to the presence of naturally-occurring radionuclides in water liable to-

- (a) affect the quality of drinking water supplies; or
- (b) affect any other exposure pathway,

so as to be a concern from a radiation protection point of view, the competent authority may require that practice to be subject to notification.

(2) Subject to subregulations (7) and (8) and regulation 53(1) (which relates to transitional provisions), any radiation employer who intends for the first time to carry out work to which this regulation applies shall notify the competent authority at least 28 days (or such shorter time as the authority may agree) before he commences that work, which notification shall be in accordance with Schedule 2.

(3) Upon receipt of a notification pursuant to subregulation (2), the competent authority may, by notice in writing, require the radiation employer to provide it with any or all of the additional particulars specified in Schedule 3 by such time as may be specified in the notice or by such other time as the authority may subsequently agree.

(4) A notice under subregulation (3) may require the radiation employer to notify the competent authority of any of the particulars specified therein before each occasion on which he commences work with ionising radiation.

(5) Where a radiation employer subsequently ceases to work, or makes any change to the work in respect of which he has submitted a notification pursuant to subregulation (2), such that the particulars provided therein are no longer accurate, he shall notify the competent authority forthwith of that change.

(6) Nothing in subregulation (5) shall be taken as requiring a cessation of the work which has been changed except where the change to the work involves vacating the site or any part of the site where the work was being carried out.

(7) Where the only work with ionising radiation being carried out is of a kind which is referred to in regulation 3(1)(b) or (c), it shall be sufficient compliance with subregulation (2) if the radiation employer having control of the premises where the work is being carried out submits the notice required by that subregulation forthwith after that work has commenced.

(8) Where the work with ionising radiation involves the care of a person to whom a medicinal product (within the meaning of the Ionising Radiation (Administration of Medicinal Products and Medicinal Exposures) Regulations 2002) has been administered, it shall be sufficient compliance with subregulation (2) if the notification required by that subregulation is submitted as soon as is practicable before such work is carried out.

(9) Where in respect of work with ionising radiation being carried out prior to the coming into force of these Regulations notification has been given to the Government pursuant to any statutory requirement, the provisions of this regulation shall apply to such notification as if that notification had been given in accordance with subregulation (2).

**Prior risk assessment etc.**

8.(1) No radiation employer shall commence any new activity involving work with ionising radiation unless he has made a suitable and sufficient assessment of the risk to any employee and any other person of exposure to ionising radiation, for the purpose of identifying the measures he needs to take to restrict such exposure.

(2) A risk assessment made by a radiation employer pursuant to subregulation (1) shall include-

- (a) identification of all hazards with the potential to cause a radiation accident; and
- (b) evaluation of the nature and magnitude of the risk to employees and other persons arising from any such hazards.

(3) Where a risk assessment made pursuant to subregulation (1) reveals a risk to any employee or other person of exposure to ionising radiation from an identifiable radiation accident, the radiation employer shall take all reasonably practicable steps to-

- (a) prevent the occurrence of any such accident;
- (b) limit the consequences of any such accident which does occur; and
- (c) provide employees who may be affected by any such accident with the necessary information, instruction, training and equipment to restrict their exposure to ionising radiation.

(4) The requirements of this regulation are without prejudice to the requirements of regulation 7 (Risk assessment) of the Management of Health and Safety at Work Regulations 1996.

**Restriction of exposure.**

9.(1) Every radiation employer shall take all necessary steps, in relation to any work with ionising radiation carried out by him, to restrict, so far as is reasonably practicable, the exposure of his employees and other persons to such radiation.

(2) Without prejudice to the generality of subregulation (1), the radiation employer shall ensure that, in so far as it is reasonably practicable, the exposure of his employees and other persons to ionising radiation is restricted-

- (a) by means of engineering controls and design features and by the provision of safety features and warning devices;
- (b) by the provision of suitable systems of work; and



- (c) by the provision of adequate and suitable personal protective equipment, including respiratory protective equipment, unless the use of personal protective equipment of a particular kind is not appropriate having regard to the nature of the work or the circumstances of the particular case.
- (3) A radiation employer shall take all reasonable steps to ensure that whatever is provided pursuant to subregulation (2) is properly used or applied, as the case may be.
- (4) Where appropriate, the radiation employer shall use dose constraints at the planning stage of radiation protection in order to restrict exposure to ionising radiation, pursuant to subregulation (1).
- (4A) A radiation employer shall establish the dose constraints referred to in subregulation (4) in terms of the effective or equivalent dose received by an individual over an appropriate period of time.
- (5) Without prejudice to the generality of subregulation (1) and subject to subregulation (6), a radiation employer shall ensure that-
- (a) in relation to an employee who is pregnant, her exposure to ionising radiation is restricted such that the equivalent dose to the foetus will be as low as reasonably achievable and that it will be unlikely to exceed 1 mSv during the remaining period of her pregnancy; and
  - (b) in relation to an employee who is breastfeeding, she is not employed in work involving a significant risk of intake of radionuclides or of bodily radioactive contamination.
- (6) Nothing in subregulation (5) shall require the radiation employer to take any action in relation to any employee who is pregnant or breastfeeding unless-
- (a) she has notified her employer in writing of her condition; and
  - (b) the radiation employer (where he is not her employer) has been made aware or should otherwise have reasonably been expected to be aware of her condition.
- (7) For the purpose of determining whether the requirements of subregulation (1) are being met, every radiation employer shall ensure that an investigation is carried out forthwith when the effective dose of ionising radiation received by any of his employees for the first time in any calendar year exceeds 15 mSv or such other lower effective dose as the employer may have specified in writing in local rules, pursuant to regulation 19(1) or, where local rules are not required, by other suitable means.

**Personal protective equipment.**

10.(1) Any item of personal protective equipment provided by a radiation employer pursuant to regulation 9 shall comply with any provision in the Factories (Provision and Use of Work Equipment) Regulations 1999 which is applicable to that item.

(2) Where in the case of respiratory protective equipment no provision of the Regulations referred to in subregulation (1) applies, that respiratory protective equipment shall not be suitable for the purposes of regulation 9 unless it is of a type or conforms to a standard, approved in either case by the competent authority.

(3) Every radiation employer shall-

- (a) ensure that appropriate accommodation is provided for the storage of any personal protective equipment provided pursuant to regulation 9; and
- (b) take all reasonable steps to ensure that such equipment is placed therein, when it is not being worn.

**Maintenance and examination of engineering controls etc. and personal protective equipment.**

11. Every radiation employer shall ensure that any engineering controls, design features, safety features, warning devices and personal protective equipment provided pursuant to regulation 9-

- (a) are properly maintained;
- (b) where appropriate, are examined thoroughly and tested at suitable intervals; and
- (c) in the case of respiratory protective equipment, a suitable record of any such examination is-
  - (i) made (which record shall include a statement of the condition of the equipment at the time of the examination); and
  - (ii) kept for at least two years from the date of the said examination.

**Dose limitation.**

12.(1) Subject to subregulation (2), every employer shall ensure that the dose limits specified in Part I of Schedule 4 in relation to each of the classes of persons mentioned therein are not exceeded.

(2) Where an employer is able to demonstrate to the competent authority that, in respect of an employee, the dose limit specified in paragraph 1 of Schedule 4 is impracticable having regard to the nature of the work undertaken by that employee, the competent authority may in respect of that employee authorise the employer to apply the dose limits set out in paragraphs 9 or 10 of Schedule 4 and in such case the provisions of Part II of that Schedule will have effect.

(3) The steps taken by a relevant employer to comply with subregulation (1) in respect of members of the public shall include an estimation of doses to members of the public from the relevant practice or practices carried out by the relevant employer in accordance with requirements regarding the estimation of doses as approved by the competent authority from time to time.

(4) When considering the estimation of doses to the members of the public the competent authority, where appropriate, shall-

- (a) decide on a reasonable extent of surveys to be conducted and information to be taken into account in order to identify the representative person, taking into account the effective pathways for transmission of the radioactive substances;
- (b) decide on a reasonable frequency of monitoring of the relevant parameters as determined in paragraph (a);
- (c) ensure that the estimates of doses to the representative person include-
  - (i) assessment of the doses due to external radiation, indicating, where appropriate, the type of radiation in question,
  - (ii) assessment of the intake of radionuclides, indicating the nature of the radionuclides and, where necessary, their physical and chemical states, and determination of the activity concentrations of these radionuclides in food and drinking water or other relevant environmental media,
  - (iii) assessment of the doses that the representative person, as identified in paragraph (a), is liable to receive;
- (d) require records to be kept and be made available on request to all stakeholders relating to measurements of external exposure and contamination, estimates of intakes of radionuclides, and the results of the assessment of the doses received by the representative person.

(5) In this regulation “relevant practice” means a practice to which regulations 6 or 6A applies.

**Contingency plans.**

13.(1) Where a risk assessment made pursuant to regulation 8 shows that a radiation accident is reasonably foreseeable (taking into account the steps taken pursuant to subregulation (3) of that regulation), the radiation employer shall prepare a contingency plan designed to ensure the health and safety of his employees and other persons who may be affected by such an accident and, in particular, to restrict the exposure of such persons to ionising radiation, so far as is reasonably practicable.

(2) Where a radiation employer prepares a contingency plan pursuant to subregulation (1) he shall ensure that-

- (a) those of his employees who may be concerned with or affected by arrangements in the plan are-
  - (i) provided with such information and instruction as is suitable and sufficient for them to know what they must do in the event of a radiation accident; and
  - (ii) issued, where appropriate, with suitable dosimeters or other devices obtained in either case from the approved dosimetry service with which the radiation employer has entered into an arrangement pursuant to regulation 23;
- (b) where appropriate, rehearsals of the arrangements in the plan are carried out at suitable intervals; and
- (c) in circumstances where it is necessary for some or all of the arrangements in the plan to be carried out-
  - (i) the cause of those circumstances is analysed to determine, so far as is reasonably practicable, the measures, if any, required to prevent a recurrence of such circumstances,
  - (ii) a record of such analysis is made and kept for at least 2 years from the date on which it was made, and
  - (iii) any exposure which occurs due to the above circumstances is noted on any relevant dose record.

(3) The radiation employer shall ensure that a copy of any contingency plan prepared pursuant to subregulation (1) is incorporated into any local rules made pursuant to regulation 19(1), by way of summary or reference.

### **PART III**

#### **ARRANGEMENTS FOR THE MANAGEMENT OF RADIATION PROTECTION**

##### **Radiation protection advisers.**

14.(1) Subject to subregulation (3), every radiation employer shall consult such suitable radiation protection advisers as are necessary for the purpose of advising him on the application of these Regulations ensuring that any work with ionising radiation is carried out in accordance with these Regulations, which consultation shall include the matters specified in Schedule 5.

(2) Where a radiation employer consults a radiation protection adviser pursuant to subregulation (1) with regard to any matters other than those specified in Schedule 5, the employer shall appoint that adviser in writing and specify in that appointment the scope of the advice which the adviser is required to give.

(3) Nothing in subregulation (1) shall require a radiation employer to consult a radiation protection adviser where the only work with ionising radiation carried out by him is work specified in Schedule 1.

(4) The radiation employer shall provide any radiation protection adviser appointed by him with adequate information and facilities for the performance of his functions.

(5) The radiation protection adviser shall, where appropriate, liaise with the medical physics expert.

##### **Information, instruction and training.**

15.(1) Every radiation employer shall ensure that-

- (a) those of his employees who are engaged in work with ionising radiation are given suitable and sufficient information, instruction and training in the field of radiation protection (having regard to the specific work to be carried out) for the purpose of ensuring that they know-
  - (i) the risks to health created by exposure to ionising radiation as a result of their work,

- (ii) the general and specific radiation protection procedures and precautions which should be taken in connection with the work with ionising radiation to which they may be assigned,
  - (iii) the importance of complying with the administrative, medical and technical requirements of these Regulations, and
  - (iv) the relevant parts of the emergency response plans and procedures;
- (b) any of his female employees who are engaged in work with ionising radiation are informed of the possible risk arising from ionising radiation to the foetus and to a nursing infant and of the importance of their informing their employer in writing as soon as reasonably practicable-
- (i) after becoming aware of their pregnancy, or
  - (ii) if they intend to breastfeed an infant;
- (c) adequate information is given to any other person who is directly concerned with the work with ionising radiation carried out by the radiation employer, for the purpose of ensuring, so far as is reasonably practicable, that person's health and safety;
- (d) any employees engaged in work in a controlled area are given specific training in connection with the characteristics of the workplace and the activities within it; and
- (e) the giving of training and information under this regulation is repeated at appropriate intervals and documented by the employer.
- (2) The competent authority shall ensure that the management of an installation where orphan sources are most likely to be found or processed are informed of the possibility that they may be confronted with a source.
- (3) The management of an installation under subregulation (2) shall ensure that employees in the installation, who may be confronted with a source, are-
- (a) advised and trained in the visual detection of sources and their containers;
  - (b) informed of basic facts about ionising radiation and its effects;
  - (c) informed of and trained in the actions to be taken on site in the event of the detection or suspected detection of a source.

(4) In relation to high-activity sealed sources, the appropriate training and adequate information under subregulation (1) shall include-

- (a) specific requirements for the safe management of such a source;
- (b) particular emphasis on the necessary safety requirements in relation to such a source; and
- (c) specific information on possible consequences of the loss of adequate control of such a source,

and the training and information shall be repeated at regular intervals and documented, with a view to preparing the employees for such matters.

(5) A radiation employer shall ensure that emergency workers who are identified in an emergency response plan or off-site emergency response plan are-

- (a) given adequate and regularly updated information on the health risks their intervention might involve;
- (b) given adequate information on the precautionary measures to be taken in such an event; and
- (c) provided with appropriate radiation protection training and information,

and this information should take into account the range of potential emergencies and the type of intervention.

(6) As soon as an emergency occurs, the information referred to in subregulation (5) shall be supplemented appropriately, having regard to the specific circumstances.

(7) Where appropriate, the competent authority shall ensure that emergency workers are provided with adequate training in regards to any off-site emergency response plan under the Radiation (Emergency Preparedness and Public Information) Regulations 2004.

**Co-operation between employers.**

16. Where work with ionising radiation carried out by a radiation employer is likely to give rise to the exposure to ionising radiation of any employee of another employer, the employers concerned shall co-operate with each other (by the exchange of information or otherwise) to the extent necessary to ensure that each such employer is able to comply with the requirements of these Regulations in so far as his ability to comply depends upon such co-operation.

**PART IIIA****EXISTING EXPOSURE SITUATIONS****Operation protection of members of the public.**

16A.(1) The competent authority shall ensure that the operational protection of members of the public in normal circumstances from practices subject to authorisation shall include, for relevant facilities, the following-

- (a) examination and approval of the proposed siting of the facility from a radiation protection point of view, taking into account, where appropriate, relevant demographic, meteorological, geological, hydrological and ecological conditions;
- (b) acceptance into service of the facility subject to adequate protection being provided against any exposure or radioactive contamination liable to extend beyond the perimeter of the facility or radioactive contamination liable to extend to the ground beneath the facility;
- (c) examination and approval of plans for the discharge of radioactive effluents; and
- (d) measures to control the access of members of the public to the facility.

(2) The competent authority shall, where appropriate, establish authorised limits as part of the discharge authorisation and conditions for discharging radioactive effluents which shall-

- (a) take into account the results of the optimisation of radiation protection;
- (b) reflect good practice in the operation of similar facilities.

(3) An employer with responsibility for practices where a discharge authorisation is granted shall-

- (a) monitor appropriately; or
- (b) where appropriate, evaluate,

The radioactive airborne or liquid discharges into the environment in normal operation, and report the results to the competent authority.



**Programmes on existing exposure situations.**

16B.(1) The competent authority shall ensure that measures are taken, upon indication or evidence of exposures that cannot be disregarded from a radiation protection point of view, to-

- (a) identify and evaluate existing exposure situations taking into account the types of existing exposure situations listed in Schedule 13; and
- (b) determine the corresponding occupational and public exposures.

(2) The competent authority may decide, having regard to the general principle of justification, that an existing exposure situation warrants no consideration of protective or remedial measures.

**Establishment and implementation of strategies.**

16C.(1) The competent authority shall arrange, where appropriate, for the establishment of strategies to ensure the appropriate management of existing exposure situations commensurate with the risks and with the effectiveness of protective measures.

- (2) Each strategy established in accordance with subregulation (1) shall contain-
  - (a) the objectives pursued; and
  - (b) appropriate reference levels, taking into account the reference levels laid down in Schedule 15.
- (3) The competent authority shall assign responsibilities for the implementation of strategies for the management of existing exposure situations, and ensure appropriate coordination between relevant parties involved in the implementation of remedial and protective measures.
- (4) The distribution of doses that has resulted from the implementation strategies shall be assessed, and further efforts shall be considered if need be, with the view to optimising protection and reducing any exposures that are still above the reference levels.
- (5) The competent authority, where appropriate, shall-
  - (a) evaluate the available remedial and protective measures for achieving the objectives and the efficiency of planned and implemented measures;
  - (b) provide information to exposed populations on the potential health risks and on the available means for reducing their exposure;

- (c) provide guidance for the management of exposures at individual or local level; and
- (d) with regard to activities that involve naturally occurring radioactive material and are not managed as planned exposure situations, provide information on appropriate means for monitoring concentrations and exposures and for taking protective measures.

**Radiation action plan.**

16D.(1) If there are any long-term risks of radon exposure in any buildings or workplaces as a result of a source of radon ingress, the competent authority shall, by whatever means it deems appropriate, establish a plan for addressing these risks.

(2) In developing the plan under subregulation (1) the competent authority shall take into account the issues set out in Schedule 16, and identify any areas where the radon concentration, taken as an annual average, exceeds the reference level established under regulation 3(1)(b).

**Environmental monitoring and contaminated areas.**

16E.(1) The competent authority shall, where appropriate, undertake appropriate environmental monitoring.

(2) If an area appears to be contaminated, the competent authority shall, where appropriate, investigate and manage the situation by considering-

- (a) objectives, including long-term goals pursued by the strategy and corresponding reference levels;
- (b) delineation of the affected areas and identification of the affected members of the public;
- (c) consideration of the need for and extent of protective measures to be applied to the affected areas and members of the public;
- (d) consideration of the need to prevent or control access to the affected areas, or to impose restrictions on living conditions in these areas;
- (e) assessment of the exposure of different groups in the population and assessment of the means available to individuals for controlling their own exposure.

(3) Before the resumption of habitation, economic or social activities on an area which is contaminated as a result of the after-effects of an emergency, past practice or past work activity and which cannot be disregarded from a radiation protection point of view, the competent

authority shall ensure that arrangements are in place, as appropriate, for the on-going control of exposure to ionising radiation with the aim of establishing living conditions that can be considered as normal, including-

- (a) setting of appropriate reference levels;
- (b) establishment of an infrastructure to support continuing self-help protective measures in the affected areas, which may include the provision of information, advice and monitoring;
- (c) remediation measures;
- (d) the delineation of areas.

**Building materials.**

16F.(1) The reference level applying to indoor external exposure to gamma radiation emitted by building materials, in addition to outdoor external exposure, shall be 1 mSv per year.

(2) If an employer is aware that a building material is of concern from a radiation protection point of view, taking into account the indicative list in Schedule 17, it shall ensure that before such building material is used-

- (a) the activity concentrations of the radionuclides specified in Schedule 18 are determined; and
- (b) if requested, the competent authority is provided with information on the results of measurements and the corresponding activity concentration index, as well as other relevant factors, as defined in Schedule 18.

**PART IV**

**DESIGNATED AREAS**

**Designation of controlled area.**

17.(1) Where, pursuant to regulation 8 or otherwise, a radiation employer makes a risk assessment which shows that, in relation to an area under his control-

- (a) there is a risk that persons entering the area will receive significant exposure to ionising radiation or there is a significant risk of the spread of radioactive contamination outside the area, such that it is necessary to require those persons

who enter or work in the area to follow special procedures designed to restrict such exposure and to limit such spread; or

- (b) any person working in that area is likely to receive an effective dose of ionising radiation-
  - (i) greater than 6mSv per year, or
  - (ii) an equivalent dose greater than 15mSv per year for the lens of the eye, or
  - (iii) an equivalent dose greater than 150mSv per year for the skin or the extremities,

the employer shall designate that area as a controlled area.

(2) No employer shall intentionally create in any area conditions which would require that area to be designated as a controlled area unless that area is for the time being under his control.

**Designation of supervised areas.**

18. Where, pursuant to regulation 8 or otherwise, a radiation employer makes a risk assessment which shows that, in relation to any area under his control, other than a controlled area-

- (a) the working conditions are such that they must be kept under review because it may become necessary to designate the area as a controlled area; or
- (b) any person entering that area is likely to receive an effective dose of ionising radiation-
  - (i) greater than 1mSv a year, or
  - (ii) an equivalent dose of 5mSv per year for the lens of the eye, or
  - (iii) an equivalent dose greater than 50 mSv per year for the skin and the extremities,

the employer shall designate that area as a supervised area.

**Local rules and radiation protection supervisors.**

19.(1) Every radiation employer shall make and set down in writing such local rules as are appropriate to the radiation risk associated with the radiation sources and the operations involved in the work with ionising radiation-

- (a) in any controlled area; and
- (b) where appropriate, having regard to the nature of the work, in any supervised area.

(1A) Local rules shall identify the main working instructions intended to restrict any exposure in that controlled or supervised area.

(2) The radiation employer shall take all reasonable steps to ensure that any local rules made pursuant to subregulation (1) are observed.

(3) The radiation employer shall ensure that such of those rules made pursuant to subregulation (1) as are relevant are brought to the attention of those employees and other persons who may be affected by them.

(4) The radiation employer shall-

- (a) appoint one or more suitable radiation protection supervisors for the purpose of ensuring compliance with these Regulations in respect of work carried out in any designated area made subject to local rules, pursuant to subregulation (1), and, in particular, for the purpose of ensuring such local rules are observed; and
- (b) ensure that such supervisors receive the appropriate training to enable them to fulfil their role.

(4A) The responsibilities of the radiation protection supervisor may be carried out by-

- (a) a radiation protection unit established by the radiation employer; or
- (b) a radiation protection adviser.

(5) The radiation employer shall ensure that-

- (a) any area designated as a controlled area pursuant to regulation 17 or as a supervised area pursuant to regulation 18 is adequately described; and
- (b) the names of any radiation protection supervisors appointed pursuant to subregulation (2) are set down,

in any local rules made pursuant to subregulation (1).

**Additional requirements for designated areas.**

20.(1) Where a radiation employer designates any area as a controlled area he shall ensure-

- (a) that the area is physically demarcated or, where this is not reasonably practicable, delineated by some other suitable means; and
- (b) that suitable and sufficient signs are displayed in suitable positions indicating-
  - (i) that the area is a controlled area;
  - (ii) the nature of the radiation sources therein; and
  - (iii) the risks arising from such sources.

(2) No employer shall permit any employee or other person to enter or remain in a controlled area unless that employee or other person, as the case may be-

- (a) is a person designated by the employer as a classified person;
- (b) is an outside worker in respect of whom the employer has taken all reasonable steps to ensure that-
  - (i) he is subject to individual dose assessment, pursuant to regulation 23;
  - (ii) he has been provided with adequate and suitable personal protective equipment, where necessary, pursuant to regulation 9(2)(c) and has been trained to use it;
  - (iii) he has been given suitable and sufficient information, instruction and training, pursuant to regulation 15; and
  - (iv) an appointed doctor has determined, pursuant to regulation 26, that he is fit for the work with ionising radiation which he is to carry out; or
- (c) not being a person who falls into either paragraph (a) or (b), is subject to suitable written arrangements drawn up for the purpose of ensuring that whilst he is in the controlled area-
  - (i) in the case of an employee of 18 years of age or above, he does not receive in any calendar year a cumulative dose of ionising radiation which would

require him to be designated as a classified person pursuant to regulation 22; or

- (ii) in the case of any other person, he does not receive in any calendar year a dose of ionising radiation which exceeds any relevant dose limit specified in Schedule 4,

and the employer can demonstrate, by personal dose monitoring or other suitable measurement, that the doses are restricted accordingly.

(3) Where an employer monitors or measures the exposure of any employee or other person pursuant to subregulation (2)(c), he shall-

- (a) keep the results for a period of two years from the date they were recorded; and
- (b) make them available to that person at his request and upon reasonable notice being given.

(4) Where any outside worker is required to work in any area designated by a radiation employer as a controlled area, that employer shall ensure that-

- (a) the outside worker is subject to arrangements for estimating the dose of ionising radiation he receives whilst in the controlled area;
- (b) as soon as is reasonably practicable after the work carried out by the outside worker in the controlled area is completed, an estimate of the dose of ionising radiation received by him is entered into his radiation passbook; and
- (c) whilst the radiation passbook is in the possession of the radiation employer, it is made available to the outside worker, upon request.

(5) Where there is a significant risk of the spread of radioactive contamination from any area which has been designated by a radiation employer as a controlled area, that employer shall make adequate arrangements to restrict, so far as is reasonably practicable, any such spread.

(6) Without prejudice to the generality of subregulation (5), the arrangements required by that subregulation shall include, where appropriate-

- (a) the provision and maintenance of suitable and sufficient washing and changing facilities for persons who enter or leave any controlled area;

- (b) the prohibition of eating, drinking, smoking and any other similar activity which is likely to result in the ingestion, inhalation or absorption of a radioactive substance in any controlled area; and
  - (c) the means for monitoring contamination-
    - (i) within a controlled area and, where appropriate, in the adjacent area, and
    - (ii) on any person, article or goods leaving a controlled area.
- (7) Where appropriate, a radiation employer who designates any area as a supervised area shall ensure-
- (a) that suitable and sufficient signs are displayed in suitable positions indicating-
    - (i) that the area is a supervised area;
    - (ii) the nature of the radiation sources therein; and
    - (iii) the risks arising from such sources; and
  - (b) the provision and maintenance of suitable and sufficient washing and changing facilities for persons who enter or leave any such area.

**Monitoring of designated areas.**

21.(1) Every radiation employer who designates any area as a controlled area or as a supervised area shall take such steps as are necessary (otherwise than by use of assessed doses of individuals), having regard to the nature and extent of the risks arising from exposure to ionising radiation, to ensure that levels of ionising radiation are adequately monitored and that working conditions are kept under review in any such area.

- (1A) Adequate monitoring referred to in subregulation (1) shall include-
- (a) in relation to areas designated on the basis of external radiation, measurement of dose rates, averaged over a suitable period if necessary; and
  - (b) in relation to areas designated on the basis of internal radiation, measurements of air activity and surface contamination where appropriate taking into account the physical and chemical states of the radioactive contamination.
- (2) The radiation employer shall provide suitable and sufficient equipment for carrying out the monitoring required by subregulation (1), which equipment shall be-



- (a) maintained so that it remains fit for the purpose for which it was intended;
  - (b) tested by or under the immediate supervision of a qualified person before it is used for the first time in order to establish its performance; and
  - (c) subsequently examined and tested by or under the immediate supervision of a qualified person at appropriate intervals.
- (3) The radiation employer shall-
- (a) make suitable records of the results of any monitoring carried out pursuant to subregulation (1) and of any test or examination carried out pursuant to subregulation (2);
  - (b) ensure that the records of the tests carried out pursuant to subregulation (2)(b) are authenticated by the qualified person under whose direction the tests were carried out; and
  - (c) keep the records referred to in paragraph (a), or copies thereof, for at least two years from the respective dates on which they were made.
- (4) Suitable records of the results of the monitoring referred to in subregulation (3)(a) shall include-
- (a) in relation to areas designated on the basis of external radiation, an indication of the nature and quality of the radiation in question;
  - (b) in relation to areas designated on the basis of internal radiation, an indication, where appropriate, of the nature and physical and chemical states of the radioactive contamination.

**Arrangements in workplaces.**

21A.(1) Workplaces where-

- (a) the radon concentration continues to exceed the reference level at regulation 3(1)(b); and
- (b) the exposure of workers is liable to exceed an effective dose of 6 mSv per year,

shall be managed as a planned exposure situation, with the competent authority determining which requirements under this Part are appropriate.

(2) Pursuant to subregulation (1), where the effective dose to workers is less than or equal to 6 mSv per year the competent authority shall require that the exposure be kept under review.

(3) If the employer operates a commercial aircraft registered in Gibraltar, where the effective dose to the crew from cosmic radiation is liable to exceed 6 mSv per year, this Part shall apply, allowing for the specific features of this exposure situation.

(4) Pursuant to subregulation (3) where the effective dose to the crew is liable to be above 1 mSv per year, the competent authority shall require that the employer take appropriate measures, in particular-

- (a) to assess the exposure of the crew concerned;
- (b) to take into account the assessed exposure when organising working schedules with a view to reducing the doses of highly exposed crew;
- (c) to inform the workers concerned of the health risks their work involves and their individual dose;
- (d) to apply regulation 9(6) to pregnant air crew.

## **PART V**

### **CLASSIFICATION AND MONITORING OF PERSONS**

#### **Designation of classified persons.**

22.(1) Subject to subregulation (2), the employer shall designate as a classified person any of his employees who is likely to receive an effective dose of ionising radiation-

- (a) greater than 6mSv per year; or
- (b) an equivalent dose greater than 15mSv per year for the lens of the eye; or
- (c) an equivalent dose greater than 150 mSv per year for the skin or the extremities,

and shall immediately inform those employees that they have been so designated.

(2) The employer shall not designate an employee as a classified person unless-

- (a) that employee is aged 18 years or above; and

- (b) an appointed doctor has certified in the health record relating to that employee that he is fit for the work with ionising radiation which he is to carry out.
- (3) Where an employer designates an employee as a classified person pursuant to subregulation (1) he may only cease to treat him as such at the end of a calendar year unless, in the interim-
  - (a) an appointed doctor requires otherwise; or
  - (b) the employee ceases to be employed by the employer in a capacity which is likely to result in significant exposure to ionising radiation during the remainder of the relevant calendar year.

**Dose assessment and recording.**

23.(1) Where an employer designates any employee as a classified person he shall make arrangements with one or more approved dosimetry services for-

- (a) the systematic assessment of any dose of ionising radiation received by that employee which is likely to be significant; and
  - (b) the making and maintenance of a record of all such assessments, hereinafter referred to as a “dose record”.
- (2) The systematic assessment referred to in subregulation (1)(a) shall be based upon a suitable form of individual measurement established by the approved dosimetry service, except where such measurement would be impossible or inadequate, in which case it shall be based upon another suitable form of measurement.
- (3) The dose record referred to in subregulation (1)(b), or a copy thereof, shall be kept until the person to whom it relates has attained or would have attained the age of 75 years but in any event for a period of at least 30 years from the date it was made.
- (4) In addition to the arrangements made pursuant to subregulation (1), the employer shall make arrangements with one or more approved dosimetry services-
- (a) at appropriate intervals, to provide the employer with a suitable summary of the dose record relating to each classified person employed by him;
  - (b) when required by the employer, to provide him with a copy of the dose record relating to a particular employee;
  - (c) when required by the employer, to-

- (i) make a record of the information concerning the dose assessments relating to a classified person who ceases to be an employee of the employer; and
  - (ii) send that record (hereinafter referred to as a “termination record”,) to the competent authority; and a copy thereof to the employer forthwith;
- (d) within three months of the end of each calendar year, or such longer period as the competent authority may agree, to send to the authority summaries of all dose records relating to that year;
- (e) when required by the competent authority, to send a copy of the dose record relating to any particular employee to the authority;
- (f) where the dose of ionising radiation received by any classified person during any period of time is estimated pursuant to regulation 24, to-
- (i) make an entry in the dose record relating to that person; and
  - (ii) keep a summary of the information used to estimate that dose;
- (g) where the employer employs an outside worker, to provide, where appropriate, a radiation passbook in respect of that worker; and
- (h) where the employer employs an outside worker who works in Great Britain, Northern Ireland or in a Member State, to maintain a continuing record of the assessment of doses received by him whilst working in that place.
- (5) The employer shall provide the approved dosimetry services appointed by him with such information concerning his employees as is necessary to enable those services to comply with the arrangements made with the employer, pursuant to subregulations (1) and (4).
- (6) Where an employer employs an outside worker he shall-
- (a) ensure that he is provided with a radiation passbook which shall not be transferable to any other worker and in which shall be entered the particulars set out in Schedule 6; and
  - (b) make suitable arrangements to ensure that the particulars entered in his radiation passbook pursuant to paragraph (a) are kept up-to-date throughout his period of employment with him.

(7) At the request of, and upon reasonable notice being given by, a classified person employed by him or formerly employed by him in that capacity, the radiation employer shall ensure that such person is provided with-

- (a) a copy of the summary of the dose record relating to him for the two year period preceding the request; and
- (b) a copy of the dose record relating to that person.

(8) When a classified person ceases to be employed by an employer, that employer shall take all reasonable steps to ensure that such person is provided with a copy of the termination record relating to him.

(9) The employer shall keep a copy of the summary of the dose record relating to each classified person for a period of at least two years from the end of the calendar year to which the summary relates.

**Estimated doses and special entries.**

24.(1) Where a dosimeter or other device is used to make any individual measurement of the dose of ionising radiation received by any classified person, pursuant to regulation 23(2) and that dosimeter or device is lost, damaged or destroyed or, for any other reason, it is not practicable to assess the dose received by that person over any period, the employer shall-

- (a) investigate the circumstances of the case with a view to estimating the dose received by that person during that period;
- (b) (i) in a case where there is adequate information to estimate the dose received by that person-
  - (aa) send a summary of that information to the relevant approved dosimetry service; and
  - (bb) arrange for that service to enter the estimated dose and identify it as such in the dose record of that person; or
- (ii) in a case where there is inadequate information to estimate the dose received by that person, arrange for the relevant approved dosimetry service to enter a notional dose and identify it as such in the dose record of that person, which dose shall be the proportion of the total annual dose limit for the relevant period; and

- (c) in either case referred to in paragraph (b), take all reasonable steps to inform the classified person of the entry.
- (2) At the request of, and upon reasonable notice being given by, any employee designated as a classified person or any former employee who was designated as a classified person whilst employed by the employer, in respect of whom an investigation was carried out pursuant to subregulation (1), the employer shall make available to that person (or in the case of a former employee provide that person with) a copy of the summary of information sent to the approved dosimetry service pursuant to subregulation (1)(a).
- (3) Subject to subregulations (5) and (8), where an employer has reasonable cause to believe that the dose of ionising radiation received by a classified person is much greater or much less than the relevant recorded dose entered in the dose record of that person, he shall carry out an adequate investigation of the circumstances of the exposure of that person to ionising radiation and, if that investigation confirms his belief and there is adequate information to estimate the dose received by that person, he shall-
- (a) estimate the said dose;
  - (b) send a summary of the information used to estimate the dose to the relevant approved dosimetry service;
  - (c) arrange for the approved dosimetry service to substitute the estimated dose for the relevant recorded dose entered in the dose record of that person and identify the estimated dose as a special entry; and
  - (d) notify the classified person accordingly.
- (4) The employer shall-
- (a) make a report of any investigation carried out under subregulation (3); and
  - (b) keep a copy of that report for a period of 2 years from the date it was completed.
- (5) Subregulation (3) shall not apply-
- (a) in respect of a classified person who is subject only to an annual dose limit, more than 12 months after the original entry was made in the dose record; and
  - (b) in any other case, more than 5 years after the original entry was made in the dose record.

(6) Where a classified person is aggrieved by a decision to substitute an estimated dose for a recorded dose pursuant to subregulation (3), he may apply in writing to the competent authority within 3 months of the date on which he was notified of the decision, for that decision to be reviewed.

(7) Where the competent authority concludes, in relation to any estimated dose recorded in the dose record of any classified person as a special entry, (whether as a result of a review carried out pursuant to subregulation (6) or otherwise) that-

- (a) there is reasonable cause to believe an investigation carried out pursuant to subregulation (3) was not adequate; or
- (b) it has not been established that the estimated dose recorded in the dose record is a reasonable estimate of the dose actually received,

the authority may direct the employer to re-instate the original entry in the dose record.

(8) The employer shall not arrange for the relevant approved dosimetry service to enter an estimated dose in the dose record of any classified person, pursuant to subregulation (3)(c), where-

- (a) the cumulative recorded effective dose is 20 mSv or more in any relevant calendar year; or
- (b) the cumulative recorded equivalent dose for the relevant calendar year exceeds a relevant dose limit,

unless he has obtained the prior consent of the competent authority.

**Dosimetry for accidents etc.**

25.(1) Where any accident or other incident occurs which is likely to result in any person receiving an effective dose of ionising radiation greater than 6mSv, or an equivalent dose greater than 15mSv for the lens of the eye, or greater than 150mSv for the skin or the extremities, the employer shall-

- (a) in the case of a classified person, arrange forthwith for a dose assessment to be made by the approved dosimetry service;
- (b) in the case of an employee to whom a dosimeter or other device has been issued pursuant to regulation 13(2)(b), arrange for that dosimeter or other device to be examined and for the dose of ionising radiation received to be assessed by the approved dosimetry service as soon as possible;

- (c) in any other case, arrange for the dose to be assessed by an appropriate means as soon as possible, having regard to the advice of the radiation protection adviser.
- (2) Where a dose assessment is made pursuant to subregulation (1) the employer shall-
- (a) take all reasonably practicable steps to inform each person for whom such an assessment has been made of the result of that assessment;
  - (b) keep a record of any such assessment or a copy thereof until the person to whom the record relates has or would have attained the age of 75 years but in any event for a period of at least 30 years from the date of the relevant accident or incident; and
  - (c) notify the competent authority of the result of the dose assessment as soon as possible.

**Medical surveillance.**

26.(1) This regulation shall apply in relation to-

- (a) any employee who has been designated as a classified person and any person whom an employer intends to designate as a classified person;
  - (b) any employee, not being a classified person, who has received an overexposure of ionising radiation; and
  - (c) any employee whose work with ionising radiation is subject to conditions specified in his health record by an appointed doctor under subregulation (7).
- (2) The employer shall ensure that each of his employees to whom this regulation relates is under adequate medical surveillance by an appointed doctor for the purpose of determining the fitness or continuing fitness of each such employee for the work with ionising radiation which he is to carry out.
- (3) The employer shall ensure that a health record, containing the particulars referred to in Schedule 7, is-
- (a) made and maintained in respect of each of his employees to whom this regulation relates; and



- (b) kept (or a copy thereof is kept) until the person to whom it relates has or would have attained the age of 75 years but in any event for a period of at least 30 years from the date of the last entry made in it.
  
- (4) The employer shall ensure that there is a valid entry, made by the appointed doctor, in the health record of each employee (other than any employee, not being a classified person, who has received an overexposure of ionising radiation) indicating that person's fitness for the work with ionising radiation which he is to carry out.
  
- (5) For the purposes of subregulation (4), an entry in an employee's health record shall be valid-
  - (a) for a period of 12 months from the date it was made or treated as made by virtue of subregulation (6); or
  - (b) for such shorter period as may be specified in the entry by the appointed doctor,unless cancelled before the expiry of such period by a further entry.
  
- (6) For the purposes of subregulation (5)(a), a further entry in an employee's health record made not less than 11 months nor more than 13 months after the start of the current period of validity shall be treated as if made at the end of that period.
  
- (6A) In order to safeguard the health of the employee concerned, the appointed doctor may decide whether the employee requires continuing medical surveillance after cessation of the work concerned.
  
- (7) Where an appointed doctor has certified in an employee's health record that, in his opinion, the employee should-
  - (a) not be engaged in work with ionising radiation; or
  - (b) only be engaged in work with ionising radiation under the conditions specified by him in the record,the employer shall not permit the employee to be so engaged or shall only permit him to be so engaged in accordance with the specified conditions, whichever is the case.
  
- (8) For the purpose of enabling him to carry out adequate medical surveillance of each employee to whom this regulation relates, the employer shall-
  - (a) upon request, permit the appointed doctor to inspect any workplace; and

- (b) make available to the appointed doctor-
  - (i) the summary of any dose record relating to that employee; and
  - (ii) such other records relating to that employee as the appointed doctor may reasonably require to see.

(9) Where an employee is aggrieved by any entry made by an appointed doctor in his health record he may apply to the competent authority within 3 months of being notified of the said entry, for that entry to be reviewed in accordance with a procedure approved for the purposes of this subregulation by the authority and the result of that review shall be notified to the employee and entered in his health record in accordance with the approved procedure.

**Investigation and notification of overexposure.**

27.(1) Where a radiation employer suspects or has been informed that any person is likely to have received an overexposure as a result of work carried out by that employer, that employer shall make an immediate investigation to determine whether such an overexposure has occurred.

(2) Unless the results of the investigation made pursuant to subregulation (1) show beyond reasonable doubt that no overexposure could have occurred, the radiation employer shall-

- (a) notify the suspected overexposure, as soon as is practicable-
  - (i) to the competent authority;
  - (ii) in the case of an employee of some other employer, to that employer; and
  - (iii) in the case of his own employee, to the appointed doctor; and
- (b) take all reasonable steps to notify the suspected overexposure to the person affected, as soon as is practicable.

(3) Having complied with subregulations (1) and (2), thereafter the radiation employer shall-

- (a) make or arrange for a detailed investigation to be carried out to determine-
  - (i) the dose of ionising radiation received by the individual; and
  - (ii) if there was an overexposure, why it occurred and what reasonably practicable measures, if any, are required to be taken in order to prevent a recurrence thereof;

- (b) notify the results of that investigation to the persons and authorities referred to in subregulation (2)(a), forthwith; and
  - (c)
    - (i) in the case of his own employee, notify him of the results of the investigation, including the assessment of the dose of ionising radiation received by him, forthwith; or
    - (ii) in the case of any other person, where the investigation has shown that that person received an overexposure, take all reasonable steps to notify him of his overexposure.
- (4) Where an investigation is made pursuant to subregulation (1) or (3), the radiation employer shall-
- (a) make a report of that investigation; and
  - (b)
    - (i) in the case of an immediate investigation made pursuant to subregulation (1), keep that report or a copy thereof for a period of at least two years from the date on which it was completed; and
    - (ii) in the case of a detailed investigation made pursuant to subregulation (3), keep that report or a copy thereof until the person to whom it relates has or would have attained the age of 75 years but in any event for a period of at least 30 years from the date on which it was completed.
- (5) Where the person who received the overexposure is an employee who has a dose record, his employer shall arrange for the assessment of the dose received to be entered into that dose record.

**Dose limitation for overexposed employees.**

28.(1) Without prejudice to other requirements of these Regulations and, in particular, to the requirements of regulation 26(7), where an employee has been subjected to an overexposure, subregulation (2) shall apply in relation to the employment of that employee on work with ionising radiation during the remainder of the dose limitation period, commencing at the end of the personal dose assessment period in which he was subjected to the overexposure.

(2) The employer shall ensure that any employee who has been subjected to an overexposure does not receive, during the remainder of the dose limitation period, a dose of ionising radiation greater than that proportion of any dose limit which is equal to the proportion that the remaining part of the dose limitation period bears to the whole of that period.

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(3) The employer shall inform an employee who has been subjected to an overexposure of the dose limit which is applicable to that employee for the remainder of the relevant dose limitation period.

(4) In this regulation, “dose limitation period” means, as appropriate, a calendar year or the period of five consecutive calendar years.

#### PART VI

#### ARRANGEMENTS FOR THE CONTROL OF RADIOACTIVE SUBSTANCES, ARTICLES AND EQUIPMENT

##### **Sealed sources and articles containing or embodying radioactive substances.**

29.(1) Where a radioactive substance is used as a source of ionising radiation in work with ionising radiation, the radiation employer shall ensure that whenever reasonably practicable, the substance is in the form of a sealed source.

(2) The radiation employer shall ensure that the design, construction and maintenance of any article containing or embodying a radioactive substance, including its bonding, immediate container or other mechanical protection, is such as to prevent the leakage of any radioactive substance-

- (a) in the case of a sealed source, so far as is practicable; or
- (b) in the case of any other article, so far as is reasonably practicable.

(3) The radiation employer shall-

- (a) ensure, where appropriate, that suitable tests are carried out at suitable intervals to detect any leakage of radioactive substances from any article to which subregulation (2) applies;
- (b) make a suitable record of each such test; and
- (c) keep such record for a period of at least 2 years after the article is disposed of or until a further record is made following a subsequent test on that article.

##### **Accounting for radioactive substances.**

30. For the purpose of controlling any radioactive substance which is involved in work with ionising radiation which he undertakes, every radiation employer shall-

- (a) take such steps as are appropriate to account for the quantity and location of that substance;
- (b) make a suitable record thereof; and
- (c) keep such record or a copy thereof for a period of at least 2 years from the date on which it was made and in any event for a period of at least 2 years from the date of disposal of that radioactive substance.

**Keeping and moving of radioactive substances.**

31.(1) Every radiation employer shall ensure, so far as is reasonably practicable, that any radioactive substance under his control, which is not, for the time being, in use or being moved, transported or disposed of, is kept-

- (a) in a suitable receptacle; and
- (b) in a suitable store.

(2) Every employer who causes or permits a radioactive substance to be moved (otherwise than by transporting it) shall ensure that, so far as is reasonably practicable, the substance-

- (a) is kept in a suitable receptacle; and
- (b) is suitably labelled,

while it is being moved.

(3) Nothing in subregulations (1) or (2) shall apply in relation to a radioactive substance while it is in or on the live body or corpse of a human being.

**Notification of certain incidents.**

32.(1) Every radiation employer shall notify the competent authority forthwith in any case where a quantity of a radioactive substance, which exceeds the quantity specified for that substance in column 5 of Part 1 of Schedule 8 and which was under his control, has been-

- (a) released or is likely to have been released into the atmosphere as a gas, aerosol or dust; or
- (b) spilled or otherwise released in such a manner as to give rise to significant contamination.

(1A) Subregulation (1) does not apply where such release has been justified or exempted by the Minister.

(2) Every radiation employer shall notify the competent authority forthwith in any case where he has reasonable cause to believe that a quantity of a radioactive substance, which exceeds the quantity specified for that substance in column 6 of Part 1 of Schedule 8 and which was under his control, has been lost or stolen.

(3) Where a radiation employer suspects or has been informed that an incident notifiable under subregulation (1) or (2) may have occurred, he shall make an immediate investigation and, unless that investigation shows that no such incident has occurred, he shall notify the competent authority forthwith, in accordance with the relevant subregulation.

(4) A radiation employer who makes an investigation pursuant to subregulation (3) shall-

- (a) make a report of that investigation; and
- (b) keep that report or a copy thereof for a period of at least 30 years, unless the investigation shows that no incident notifiable under subregulation (1) or (2) occurred, in which case, he shall keep that report for a period of at least 2 years from the date on which it was made.

**Duties of manufactures etc. of articles for use in work with ionising radiation.**

33.(1) Where a person erects or installs an article for use in work with ionising radiation, he shall-

- (a) undertake, where appropriate, a critical examination of the way in which the article was erected or installed, for the purpose of ensuring in particular that-
  - (i) the safety features and warning devices operate correctly, and
  - (ii) there is sufficient protection for persons from exposure to ionising radiation;
- (b) consult with the radiation protection adviser, appointed by himself or by the radiation employer, regarding the nature and extent of any critical examination and the results thereof; and
- (c) provide the radiation employer with adequate information about proper use, testing and maintenance of the article.

(2) It shall be the duty of any person who designs, manufactures, imports or supplies any article for use at work to-

- (a) ensure, as far as reasonably practicable, that the article is so designed and constructed so that it restricts, as far as reasonably practicable, the extent to which employees and other persons are or are likely to be exposed to ionising radiation;
- (b) carry out or arrange for the carrying out of such testing and examination as may be necessary for the performance of the duty imposed on him by the preceding paragraph;
- (c) take such steps as are necessary to secure that persons supplied by that person with the article are provided with adequate information about the use for which the article is designed or has been tested and about any conditions necessary to ensure that it will be safe and without risks to health at all such times as are mentioned in paragraph (a) and when it is being dismantled or disposed of; and
- (d) take such steps as are necessary to secure, so far as is reasonably practicable, that persons so supplied are provided with all such revisions of information provided to them by virtue of the preceding paragraph as are necessary by reason of its becoming known that anything gives rise to a serious risk to health or safety.

**Equipment used for medical exposure.**

34.(1) Every employer who has control, to any extent, of any equipment which is used in connection with a medical exposure shall ensure, having regard to the extent of his control, that-

- (a) the design, construction, installation and maintenance of the equipment is such that it is capable of restricting, so far as is reasonably practicable, the exposure to ionising radiation of any person who is undergoing a medical exposure, to the extent that such restriction is compatible with the intended clinical purpose or research objective; and
- (b) a suitable quality assurance programme is put in place for the purpose of ensuring that the equipment remains so capable.

(2) For the purposes of subregulation (1)(b), a quality assurance programme shall not be suitable if it does not require-

- (a) in respect of any equipment brought into use for the first time after the coming into force of these Regulations, the carrying out of adequate testing of such equipment before it is first used for clinical purposes;

- (b) the carrying out of adequate testing of the performance of the equipment at appropriate intervals and after any major maintenance procedure to that equipment; and
  - (c) where appropriate, the carrying out of such measurements at suitable intervals as are necessary to enable representative doses of ionising radiation received by persons undergoing medical exposures to be assessed.
- (3) Every employer who has control, to any extent, of any radiation equipment which is used for the purpose of diagnosis and which is installed after 6 February 2018 shall ensure, having regard to the extent of his control, that, where practicable, such equipment is provided with a device or other suitable means for informing the user of that equipment of the quantity of radiation produced by that equipment during a radiological procedure.
- (4) Where failure of any radiation equipment could result in an exposure to ionising radiation greater than that intended, any employer who has control, to any extent, of such equipment shall take all such steps as are reasonably practicable to prevent any such failure and to limit the consequences thereof.
- (5) Where a radiation employer suspects or has been informed that an incident may have occurred in which a person was exposed to ionising radiation to a much greater extent than that intended, as a result of a malfunction of, or defect in, any radiation equipment under the control of the employer, he shall-
- (a) make an immediate investigation of the suspected incident; and
  - (b) unless the immediate investigation shows beyond reasonable doubt that no such incident has occurred-
    - (i) notify the suspected incident to the competent authority forthwith;
    - (ii) make or arrange for a detailed investigation to be made of the circumstances of the exposure; and
    - (iii) arrange for an assessment to be made of the dose of ionising radiation received by the person affected.
- (6) Where an investigation is made pursuant to subregulation (5)(a) or 5(b)(ii), the radiation employer shall-
- (a) make a report of that investigation; and



- (b) (i) in the case of an immediate investigation made pursuant to subregulation (5)(a), keep that report or a copy thereof for a period of at least 2 years from the date on which it was completed; and
- (ii) in the case of a detailed investigation made pursuant to subregulation (5)(b)(ii), keep that report or a copy thereof for a period of at least 30 years from the date on which it was completed.

(7) In this regulation, “radiation equipment” means equipment which delivers ionising radiation to the person undergoing a medical exposure and equipment which directly controls the extent of the exposure.

**Misuse of or interference with sources of ionising radiation.**

35. No person shall intentionally or recklessly misuse or, without reasonable excuse, interfere with any radioactive substance or any equipment to which these Regulations apply.

**PART VII**

**DUTIES OF EMPLOYEES, ENFORCEMENT  
AND MISCELLANEOUS PROVISIONS**

**Duties of employees.**

36.(1) An employee who is engaged in work with ionising radiation shall-

- (a) not knowingly expose himself or any other person to ionising radiation to an extent greater than is reasonably necessary for the purposes of his work; and
- (b) exercise reasonable care while carrying out such work.

(2) Every employee who is provided with personal protective equipment pursuant to regulation 9(2)(c) shall-

- (a) make full and proper use of such equipment;
- (b) report forthwith to his employer any defect he discovers in any such equipment; and
- (c) take all reasonable steps to ensure that such equipment is returned after use to the accommodation provided for it.

(3) No outside worker shall-

- (a) misuse the radiation passbook issued to him; or
  - (b) falsify, or attempt to falsify, any of the information contained in such passbook.
- (4) Where an employer is required by these Regulations to arrange for a dose assessment to be made in relation to any employee, that employee shall comply with any reasonable requirement imposed upon him by his employer for that purpose.
- (5) An employee who is subject to medical surveillance pursuant to regulation 26 shall-
- (a) present himself during his working hours, when required by and at the cost of his employer, for such medical examination and tests as may be required for the purposes of subregulation (2) of that regulation; and
  - (b) provide the appointed doctor with such information concerning his health as the said doctor may reasonably require.
- (6) Where an employee has reasonable cause to believe that-
- (a) he or some other person has received an overexposure;
  - (b) an incident referred to in subregulation (1) or (2) of regulation 32 has occurred; or
  - (c) an incident referred to in subregulation (5) of regulation 34 has occurred,

he shall notify his employer forthwith of that belief.

**Approval of dosimetry services.**

37.(1) Subject to sub-regulation (2) below the competent authority (or such other person as may be specified in writing by the authority from time to time) may approve, in accordance with such criteria as may be specified by it and by a certificate in writing, a dosimetry service for such of the purposes of these Regulations or of the Radiation (Emergency Preparedness and Public Information) Regulations 2004 as are specified in the certificate and any such approval may be granted subject to conditions and may be revoked by a certificate in writing at any time.

(2) The competent authority (or such other person as may be specified in writing by the authority from time to time) shall approve, in accordance with such criteria as are specified by it and by a certificate in writing, a dosimetry service for the purposes mentioned in sub-regulation (1) that has been approved by the appropriate authority for use in the UK for the same purpose.

(3) The competent authority (or such other person as may be specified in writing by the authority from time to time) may carry out, at such suitable intervals as it considers appropriate, a re-assessment of any approval granted pursuant to subregulation (1).

(4) Subject to subregulation (5), for the estimation of effective and equivalent doses, the appropriate standard values and relationships shall be used.

(5) For external radiation, the operational quantities defined in section 2.3 of ICRP Publication 116 shall be used.

**Exemption certificates.**

38.(1) Subject to subregulation (2), the competent authority may exempt, by a certificate in writing-

- (a) any person or class of persons;
- (b) any premises or class of premises; or
- (c) any equipment or substance, or class of equipment or substance,

from any requirement or prohibition imposed by these Regulations and any such exemption may be granted subject to conditions and to a limit of time and may be revoked by a certificate in writing at any time.

(2) The competent authority shall not grant an exemption pursuant to subregulation (1) unless, having regard to the circumstances of the case and in particular to-

- (a) the conditions, if any, which it proposes to attach to the exemption; and
- (b) any other requirements imposed by or under any enactments which apply to the case,

it is satisfied that-

- (c) the health and safety of persons who are likely to be affected by the exemption will not be prejudiced in consequence of it; and
- (d) compliance with the fundamental radiation protection provisions underlying regulations 9(1) and (2)(a), 12, 13(1), 17(1), 18, 21(1), 22(1), 23(1), 26(2) and 34(1) will be achieved.

**Appointment and powers of inspectors.**

39.(1) The competent authority may appoint as inspectors (under whatever title it may from time to time determine) such persons having suitable qualifications as it thinks necessary for the purpose of enforcing these Regulations.

(2) Every appointment of a person as an inspector under this regulation shall be made by an instrument in writing, specifying which of the powers conferred on inspectors by these Regulations are to be exercisable by that person, which powers may be varied at any time by the competent authority by a further instrument in writing and an inspector shall be entitled to exercise only those powers which are so specified.

(3) When exercising or seeking to exercise any of the powers specified in his instrument of appointment, an inspector shall produce such instrument or a duly authenticated copy thereof, if so required.

(4) An inspector may-

- (a) at any reasonable time (or, in a situation which in his opinion is or may be dangerous, at any time) enter any premises in which any person is carrying on or proposes to carry on, any activity falling within these Regulations, for the purpose of ascertaining whether any such person, premises and equipment on such premises complies with these Regulations;
- (b) make such examination and investigation as may be necessary for the purpose mentioned in paragraph (a);
- (c) require any person whom he has reasonable cause to believe to be able to give any information relevant to any examination or investigation carried out under paragraph (b) to answer (in the absence of persons other than a person nominated by him to be present and any person whom the inspector may allow to be present) such questions as the inspector thinks fit to ask and to sign a declaration of the truth of his answers;
- (d) require the production of, inspect and take copies of or of any entry in-
  - (i) any books or documents which by virtue of any of these Regulations are required to be kept; and
  - (ii) any other books or documents which it is necessary for him to see for the purposes of any examination or investigation under paragraph (b);

- (e) require any person to afford him such facilities and assistance with respect to any matter or things within that person's control or in relation to which that person has responsibilities as are necessary to enable the inspector to exercise any of the powers conferred on him by this regulation;
  - (f) exercise any other power which is necessary for the purpose mentioned in paragraph (a).
- (5) Any information obtained by an inspector in exercise of his powers under these Regulations shall-
- (a) except as is necessary for the purpose of a disclosure to which paragraph (b)(iii) applies, have erased from it the name of any person who has received treatment, together with any details which might enable any such person to be identified;
  - (b) be used only for the purpose of giving effect to the obligations of the competent authority under these Regulations and shall not be disclosed to any other person except-
    - (i) in the prosecution of an offence under regulation 45;
    - (ii) to an expert or advisor engaged by the competent authority to provide to the authority information, analysis or advice for the purpose of enabling the authority to enforce these Regulations, and such person shall be subject to the like obligation of confidentiality as by this regulation is imposed on the authority;
    - (iii) to any person who by reason of having received treatment, in the opinion of the authority, should be so informed.
- (6) For the purpose of this regulation, "received treatment" means having been-
- (a) the subject of the administration of a radioactive medicinal product; or
  - (b) subject to a medical exposure, to which these Regulations apply.
- (7) Nothing in this regulation shall confer any power of entry to a nuclear powered warship, or access to information relating to nuclear-powered warships which in the opinion of the Secretary of State would raise issues of national security.

**Improvement notices.**

40. If an inspector is of the opinion that a person—

- (a) is contravening one or more of these Regulations; or
- (b) has contravened one or more of those provisions in circumstances that make it likely that the contravention will continue to be repeated,

he may serve on him a notice (“an improvement notice”) stating that he is of that opinion, specifying the provision or provisions as to which he is of that opinion, giving particulars of the reasons why he is of that opinion, and requiring that person to remedy the contravention or, as the case may be, the matters occasioning it within such period (ending not earlier than the period within which an appeal against the notice can be brought under regulation 42) as may be specified in the notice.

**Prohibition notices.**

41.(1) This regulation applies to any activities which are being or are likely to be carried on by or under the control of any person, being activities to or in relation to which any of these Regulations apply or will, if the activities are so carried on, apply.

(2) If as regards any activities to which this regulation applies an inspector is of the opinion that, as carried on or likely to be carried on by or under the control of the person in question, the activities involve or, as the case may be, will involve a risk of serious personal injury, the inspector may serve on that person a notice (“a prohibition notice”).

- (3) A prohibition notice shall—
  - (a) state that the inspector is of that opinion;
  - (b) specify the matters which in his opinion give or, as the case may be, will give rise to that risk;
  - (c) where in his opinion any of those matters involves or, as the case may be, will involve a contravention of any of these Regulations, state that he is of that opinion, specify the provision or provisions as to which he is of that opinion, and give particulars of the reasons why he is of that opinion; and
  - (d) direct that the activities to which the notice relates shall not be carried on by or under the control of the person on whom the notice is served unless the matters specified in the notice in pursuance of paragraph (b) and any associated contraventions of provisions so specified in pursuance of paragraph (c) have been remedied.
- (4) A direction given in pursuance of subregulation (3)(d) shall take effect—

- (a) at the end of the period specified in the notice; or
- (b) immediately, if the notice so declares.

**Provisions supplementary to regulations 40 and 41.**

42.(1) In this regulation “a notice” means an improvement notice or a prohibition notice.

- (2) Where a notice which is not to take immediate effect has been served—
  - (a) the notice may be withdrawn by an inspector at any time before the end of the period specified therein in pursuance of regulation 40 or regulation 41(4), as the case may be; and
  - (b) the period so specified may be extended or further extended by an inspector at any time when an appeal against the notice is not pending.

**Appeal against improvement or prohibition notice.**

43.(1) In this regulation “a notice” means an improvement notice or a prohibition notice.

(2) A person on whom a notice is served may appeal, within 21 days from the date of its service, to the Employment Tribunal and on such an appeal the Tribunal may either cancel or affirm the notice and, if it affirms it, may do so either in its original form or with such modifications as the Tribunal may in the circumstances think fit.

(3) Where an appeal under this regulation is brought against a notice within the period allowed under subregulation (2) then—

- (a) in the case of an improvement notice, the bringing of the appeal shall have the effect of suspending the operation of the notice until the appeal is finally disposed of or, if the appeal is withdrawn, until the withdrawal of the appeal;
- (b) in the case of a prohibition notice, the bringing of the appeal shall have the like effect if, on the application of the appellant, the Tribunal so directs (and then only from the giving of the direction).

**Power to deal with cause of imminent danger.**

44.(1) Where, in the case of any article or substance found by him in any premises which he has power to enter, an inspector has reasonable cause to believe that, in the circumstances in which he finds it, the article or substance is a cause of imminent danger or serious personal

injury, he may seize it and cause it to be rendered harmless (whether by destruction or otherwise).

(2) Before there is rendered harmless under this regulation—

- (a) any article that forms part of a batch of similar articles; or
- (b) any substance,

the inspector shall, if it is practicable for him to do so, take a sample thereof and give to a responsible person at the premises where the article or substance was found by him a portion of the sample marked in a manner sufficient to identify it.

(3) As soon as may be after any article or substance has been seized and rendered harmless under this regulation, the inspector shall prepare and sign a written report giving particulars of the circumstances in which the article or substance was seized and so dealt with by him, and shall—

- (a) give a signed copy of the report to a responsible person at the premises where the article or substance was found by him; and
- (b) unless that person is the owner of the article or substance, serve a signed copy of the report on the owner;

and if, where paragraph (b) applies, the inspector cannot after reasonable enquiry ascertain the name or address of the owner, the copy may be served on him by giving it to the person to whom a copy was given under paragraph (a).

#### **Offences and penalties.**

45.(1) It is an offence for a person to—

- (a) fail to discharge a duty imposed upon him by any of these Regulations;
- (b) contravene any requirement or prohibition imposed by any of these Regulations;
- (c) contravene any requirement or prohibition to which he is subject by virtue of any condition attached to an exemption granted under regulation 38.

(2) A person guilty of an offence under subregulation (1) is liable on summary conviction to a fine of four times the amount at level 5 on the standard scale.

(3) Where an offence under these Regulations committed by a body corporate is proved to have been committed with the consent or connivance of, or to have been attributable to any



neglect on the part of, any director, manager, secretary or other similar officer of the body corporate or a person who was purporting to act in any such capacity he, as well as the body corporate, is guilty of that offence and is liable to be proceeded against and punished accordingly.

(4) Where the commission by any person of an offence under these Regulations is due to the act or default of some other person, that person is guilty of the offence, and a person may be charged with and convicted of the offence by virtue of this subregulation whether or not proceedings are taken against the first mentioned person.

(5) Where there would be or would have been the commission of an offence under this regulation by the Crown but for the circumstance that, by virtue of regulation 52(1), this regulation does not bind the Crown, and that fact is due to the act or default of a person other than the Crown, that person is guilty of an offence which, but for that circumstance, the Crown would be committing or would have committed, and may be charged with and convicted of that offence accordingly.

**Defences.**

46.(1) In any proceedings against any person for an offence under regulation 6(1)(a), 6A(1) or 7(2), it shall be a defence for that person to prove that-

- (a) he neither knew nor had reasonable cause to believe that his actions were in contravention of that subregulation; and
  - (b) in a case where he discovered that he had carried out or was carrying out work subject to notification under that provision, he had forthwith-
    - (i) notified the competent authority of his discovery, and
    - (ii) provided the authority with the particulars required by that provision.
- (2) The defence in subregulation (1)-
- (a) in connection with an offence under regulation 6(1)(a), does not apply in relation to the operation of a radiation generator; and
  - (b) in connection with an offence under regulation 6A(1), only applies in relation to a practice referred to in regulation 6A(1)(d).

(3) In any proceedings against an employer for an offence under regulation 8, it shall be a defence for that employer to prove that-

- (a) he neither knew nor had reasonable cause to believe that he had commenced a new activity involving work with ionising radiation; and
  - (b) in a case where he had discovered that he had commenced a new activity involving work with ionising radiation, he had made a risk assessment in accordance with the requirements of that regulation, as soon as was practicable following his discovery.
- (4) In any proceedings against an employer for an offence under regulation 29(2) it shall be a defence for the employer to prove that-
- (a) he had received and reasonably relied upon a written statement from the supplier of the article concerned that it complied with the requirements of that provision; and
  - (b) he had complied with the requirements of regulation 29(3).
- (5) In any proceedings for a breach of duty in contravention of these Regulations against an employer of an outside worker it shall be a defence for that employer to prove that-
- (a) he had entered into a contract in writing with the employer who had designated an area as a controlled area and in which the outside worker was working or was to work for that employer, for that employer to perform that duty on his behalf; and
  - (b) the breach of duty was a result of the failure of that employer to fulfil his obligation under the contract to perform that duty.
- (6) In any proceedings for a breach of duty in contravention of these Regulations against an employer who has designated an area as a controlled area or supervised area in which any outside worker is working or is to work it shall be a defence for that employer to prove that-
- (a) he had entered into a contract in writing with the employer of that outside worker, for that employer to perform that duty on his behalf; and
  - (b) the breach of duty was a result of a failure of that employer to fulfil his obligation under the contract to perform that duty.
- (7) The person charged shall not be entitled, without leave of the court, to rely upon the defence referred to in subregulation (4) or (5) unless, within a period ending seven clear days before the hearing, he has served on the prosecutor a notice in writing that he intends to so rely and that notice is accompanied by a copy of the relevant contract and, if that contract is not in English, an accurate translation of that contract into English.

(8) Where a contravention of these Regulations by any person is due to the act or default of some other person, that other person is guilty of the offence which, (but for any defence available to the first person under this regulation), would be constituted by the act or default.

**Onus of proving limits of what is practicable etc.**

47. In any proceedings for an offence in contravention of these Regulations consisting of a failure to comply with a duty or requirement to do something so far as is practicable or so far as is reasonably practicable, it shall be for the accused to prove (as the case may be) that it was not practicable or not reasonably practicable to do more than was in fact done to satisfy the duty or requirement.

**Evidence.**

48.(1) Where an entry is required by any of these Regulations to be made in any register or other record, the entry, if made, shall, as against the person by or on whose behalf it was made, be admissible as evidence of the facts stated therein.

(2) Where an entry which is required to be made in any register or other record with respect to the observance of any of these Regulations has not been made, that fact shall be admissible as evidence that that regulation has not been observed.

**Fees.**

49.(1) Where the competent authority incurs costs in carrying out its functions under these Regulations it may charge a fee determined in accordance with subregulations (2) and (3), to any person carrying on in Gibraltar any activity to which these Regulations apply.

(2) The fee charged pursuant to subregulation (1) shall not exceed the sum of the costs reasonably incurred by the competent authority in respect of the application of these Regulations to the activity of that person and where the costs incurred are in respect of more than one person carrying on in Gibraltar an activity to which these Regulations apply the fee charged to each such person shall not exceed the proportion of such sum attributable to the activity or activities of that person.

(3) Where, in the opinion of the competent authority, the authority can properly perform its functions under these Regulations only by engaging specialists and consultants, the cost of such specialists or consultants shall be included in the fee payable under subregulation (1).

(4) The competent authority shall determine the cost of employing an officer (including a public officer) for the period of time spent by that officer carrying out any of the authority's functions under these Regulations by reference to the average cost to the authority of employing officers of the appropriate grade for such period.

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(5) When requiring payment the competent authority shall send or give to the person by whom the fee is payable a detailed statement of the work done and costs incurred and the period of time to which the statement relates and the fee shall be recoverable as a civil debt.

#### **Civil liability.**

50.(1) Breach of any duty or prohibition imposed by these Regulations, in so far as it causes damage, shall be actionable in civil proceedings.

(2) Any term of an agreement which purports to exclude or restrict the operation of subregulation (1), or any liability arising by virtue of that subregulation, shall be void.

(3) In this regulation “damage” includes the death of, or injury to, any person (including any disease and any impairment of a person’s physical or mental condition).

#### **Modifications relating to the Ministry of Defence etc.**

51.(1) In this regulation, any reference to-

- (a) “visiting forces” is a reference to visiting forces within the meaning of any provision of Part I of the Visiting Forces Act 1952; and
- (b) “headquarters or organisation” is a reference to a headquarters or organisation designated for the purposes of the International Headquarters and Defence Organisations Act 1964.

(2) The Secretary of State may, in the interests of national security, by a certificate in writing exempt-

- (a) Her Majesty’s Forces;
- (b) visiting forces;
- (c) any member of a visiting force working or attached to any headquarters or organisation; or
- (d) any person engaged in work with ionising radiation for, or on behalf of, the Secretary of State,

from all or any of the requirements or prohibitions imposed by these regulations and any such exemption may be granted subject to conditions and to a limit of time and may be revoked at any time by a certificate in writing, except that, where any such exemption is granted, suitable

arrangements shall be made for the assessment and recording of doses of ionising radiation received by persons to whom the exemption relates.

(3) Regulations 6, 6A and 7 shall not apply in relation to work carried out by, and on premises under the control of, the Secretary of State, visiting forces or any headquarters or organisation.

(4) With respect to any work with ionising radiation undertaken for, or on behalf, the Secretary of State-

- (a) the requirements to notify particulars under regulations 6(1), 6A(3), and 7(2) and (3), shall only apply in relation to the particulars that may be so specified from the list set out in subregulation (4A); and
- (b) any requirement to provide the particulars described in subregulations (4A)(d), (e), (f), (g), (h), (i) and (k) does not apply where-
  - (i) the Secretary of State decides that the provision of such particulars will be contrary to the interests of national security, or
  - (ii) suitable alternative arrangements have been agreed with the competent authority.

(4A) The particulars in subregulation (4) are-

- (a) the name, address, telephone number and email address of the employer;
- (b) the address of the premises where or from where the work activity is to be carried out and a telephone number or email address for such premises;
- (c) the nature of the business of the employer;
- (d) a description of the work with ionising radiation;
- (e) particulars of the source or sources of ionising radiation including the type of electrical equipment used or operated and the nature of any radioactive substance;
- (f) the quantities of any radioactive substance used in the work;
- (g) the identity of any person engaged in the work;
- (h) whether or not any source is to be used at premises other than the address given in subparagraph (b);

- (i) the location and description of any premises at which the work is carried out on each occasion that it is so carried out;
  - (j) the date of notification, registration or application for consent to carry out the work activity and the date of commencement of the work activity;
  - (k) the duration of any period over which the work is carried out and the date of termination of the work activity.
- (5) Regulation 25(2)(b) shall not apply in relation to-
- (a) Her Majesty's Forces;
  - (b) visiting forces; or
  - (c) any member of a visiting force working in or attached to any headquarters or organisation.
- (6) Regulation 24(6), (7) and (8), and 26(9) shall not apply in relation to-
- (a) Her Majesty's Forces;
  - (b) visiting forces; or
  - (c) any member of a visiting force working in or attached to any headquarters or organisation.
- (7) The requirement in regulations 7(2) to (5), and 16A(3) shall not have effect in any case where the Secretary of State decides that to do so would be against the interests of national security or where suitable alternative arrangements have been agreed with the Government.
- (7A) Regulation 23(4)(h) shall not apply in relation to-
- (a) Her Majesty's Forces;
  - (b) visiting forces; or
  - (c) any member of a visiting force working in or attached to any headquarters or organisation.
- (8) The requirements of regulation 13(2) and (3), and any provision of Part VIII shall not have effect to the extent that in any particular case they would, in the opinion of the Secretary of State, be against the interests of national security.

(9) In regulation 27(2) the requirement to notify a suspected overexposure and the results of the consequent investigation and assessment shall not apply in relation to the exposure of-

- (a) a member of Her Majesty's Forces;
- (b) a member of a visiting force; or
- (c) a member of a visiting force working in or attached to a headquarters or organisation.

(10) The requirements of regulation 32(1) shall not apply to Her Majesty's ships except when undergoing refit.

(11) Regulation 39 shall not apply to visiting nuclear powered warships.

**Application to the Crown.**

52.(1) The provisions of these Regulations, except regulations 40 to 48, shall bind the Crown.

(2) Although they do not bind the Crown, regulations 40 to 48 shall apply to persons in the public service of the Crown, as they apply to other persons.

(3) For the purposes of these Regulations, persons in the service of the Crown shall be treated as employees of the Crown, whether or not they would be so treated apart from this subregulation.

**Transitional provisions.**

53.(1) Where on or before 5 February 2018 an employer commences for the first time, work which is required to be notified under regulation 7(2), it shall be sufficient compliance with that regulation if the employer notifies the competent authority and provides the particulars required by that provision on or before 5 February 2018.

(2) A contingency plan that was made prior to the 6 February 2018 and complied with the Ionising Radiation Regulations 2004 shall be treated, for the purposes of regulation 13, as if made pursuant to regulation 13(1).

(2A) A person who has, before the 6 February 2018, obtained registration or authorisation to carry out a registrable practice or specified practice in accordance with regulations 6 or 6A, shall be deemed to have been granted authorisation under these Regulations.

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(3) A certificate of approval granted by the Government to a dosimetry service under these Regulations prior to 6 February 2018, shall continue in force and shall be treated as if it had been granted under regulation 37 of these Regulations.

(4) A radiation passbook approved for the purposes of these Regulations and issued prior to 6 February 2018 in respect of an outside worker employed by an employer in Gibraltar and which was at that date valid shall remain valid for such time as the worker to whom the radiation passbook relates continues to be employed by the same employer.

(5) A doctor appointed in writing by the Government for the purposes of these Regulations prior to 6 February 2018 shall be deemed to have been appointed for the purposes of these Regulations until such time as the period specified in the appointment expires or the appointment is revoked.

(6) *Deleted.*

(7) A health record made and maintained in accordance with these Regulations prior to 6 February 2018 shall remain valid for a period of 12 months from the date of the last entry made in it (or for such shorter period as may have been specified therein for the validity of the last entry by an appointed doctor under those Regulations) and such record shall be deemed, for that period, to have been made and maintained in accordance with regulation 26(3).

(8) An exemption certificate granted prior to 6 February 2018 shall continue in force until such time as it is revoked by the Government.

#### **Modifications, revocations and savings.**

54.(1) Subject to subregulation (2), the following enactments are hereby revoked—

- (a) The Ionising Radiations Regulations 1995; and
- (b) The Ionising Radiation (Outside Workers) Regulations 1995;

(2) Every certificate, register or record which was required to be kept in pursuance of any regulation revoked by that subregulation shall be kept in the same manner and for the same period as if these Regulations had not been made, except that the competent authority may approve the keeping of records at a place or in a form other than the place where, or the form in which, records were required to be kept under the regulation so revoked.

55. *Deleted.*

### **PART VIII**



**HIGH ACTIVITY SEALED SOURCES AND ORPHAN SOURCES**

**Authorisations for high-activity sealed sources.**

56.(1) The competent authority may provide authorisation for any specified practice in regulation 6A which involves a high-activity sealed source.

(2) Before issuing an authorisation under subregulation (1) the competent authority shall ensure that-

- (a) adequate arrangements have been made for the safety and control of sources, including when they become disused sources;
  - (b) adequate provision, by way of a financial security or any other equivalent means appropriate for the source in question, has been made for the safe management of sources when they become disused sources, including the case where the undertaking becomes insolvent or ceases its activities;
- (3) The arrangements in subregulation (2)(a) may provide for-
- (a) the transfer of disused sources to the supplier;
  - (b) the placement or storage of disused sources; or
  - (c) an obligation for the manufacturer or the supplier to receive disused sources.
- (4) In addition to the general authorisation requirements set out in Part II, the authorisation for a practice involving a high-activity sealed source shall at least include-
- (a) responsibilities;
  - (b) minimum staff competencies, including information and training;
  - (c) minimum performance criteria for the source, source container and additional equipment;
  - (d) requirements for emergency procedures and communication links;
  - (e) work procedures to be followed;
  - (f) maintenance of equipment, sources and containers;

- (g) adequate management of disused sources, including agreements regarding the transfer, if appropriate, of disused sources to a manufacturer, a supplier, another authorised undertaking or a waste disposal or storage facility.

(5) Subject to subregulation (6), each undertaking responsible for a high-activity sealed source shall keep records for such source that includes the information set out in Annex XIV of the Directive.

(6) The undertaking shall provide, upon request, to the competent authority an electronic or written copy of all or part of the records referred to in subregulation (5) and at least under the following conditions-

- (a) without undue delay, at the time of the establishment of such records, which shall be as soon as is reasonably practicable after the source is acquired;
- (b) at intervals to be determined by the competent authority;
- (c) if the situation indicated on the information sheet has changed;
- (d) without undue delay upon the closure of the records for a specific source when the undertaking no longer holds this source, whereby the name of the undertaking or waste disposal or storage facility to which the source is transferred shall be included;
- (e) without undue delay upon the closure of such records when the undertaking no longer holds any sources.

**Site security.**

57.(1) Where the following material is, or will be, kept, used, disposed of or accumulated on any premises-

- (a) high-activity sources; or
- (b) other sealed sources which, in the opinion of the competent authority, are of a similar level of potential hazard to high-activity sources,

the competent authority, in considering if the measures taken, or to be taken, by the applicant or person granted the authorisation ensure the adequate security of any premises, shall where it, considers it appropriate-

- (i) inspect those premises, and

- (ii) consult with the police and such other persons as it, or he, considers appropriate concerning the measures.

(2) Where subregulation (1) applies, the competent authority shall have regard to any advice it receives from the police or other persons within such time as it believes is reasonable before—

- (a) determining the authorisation or effecting any variation or cancellation of the authorisation; or
- (b) imposing any limitations and conditions on the authorisation.

(3) Where the competent authority inspects any premises under subregulation (1) it may be accompanied by such other persons as are appropriate to assist it in assessing the measures.

(4) An applicant or person holding authorisation shall permit the competent authority, and any person accompanying them, reasonable access to any premises it wishes to inspect under subregulation (1).

(5) If an applicant or person holding authorisation fails to comply with subregulation (4), the competent authority may refuse the application or cancel or revoke the authorisation insofar as it relates to the sources referred to in subregulation (1).

#### **Records and inspections.**

58.(1) The competent authority shall keep records of any undertaking authorised to perform practices with high-activity sealed sources and of the high-activity sealed sources held.

- (2) The records referred to in subregulation (1) shall include-
  - (a) the radionuclide involved;
  - (b) the activity at the time of manufacture or, if this activity is not known, the activity at the time of sale or at the time the undertaking acquired the source; and
  - (c) the type of source.

(3) The competent authority shall keep the records up to date, taking transfers of the sources and other factors into account.

#### **Control of high-activity sealed sources.**

59.(1) Each undertaking carrying out activities involving high-activity sealed sources shall-

- (a) ensure that suitable tests, such as leak tests based on international standards, are undertaken regularly in order to check and maintain the integrity of each source;
- (b) regularly verify at specific intervals, to be determined by the competent authority, that each source and, where relevant, the equipment containing the source are still present and in apparently good condition at their place of use or storage;
- (c) ensure that each fixed and mobile source is subject to adequate documented measures, such as written protocols and procedures, aimed at preventing unauthorised access to or loss or theft of the source or its damage by fire;
- (d) promptly notify the competent authority of any loss, theft, leakage or unauthorised use of a source, arrange for a check on the integrity of each source after any event, including fire, that may have damaged the source, and, if appropriate, inform the competent authority thereof and of the measures taken;
- (e) return each disused source to the supplier or place it in a facility for long term storage or disposal or transfer it to another authorised undertaking unless otherwise agreed by the competent authority, without undue delay after termination of the use;
- (f) ascertain that, before a transfer is made, the recipient has an appropriate authorisation;
- (g) promptly notify the competent authority of any accident or incident resulting in unintentional exposure of a worker or a member of the public.

(2) The manufacturer, the supplier, and each undertaking carrying out activities involving high-activity sealed sources shall ensure that the high-activity sealed sources and containers comply with the requirements for identification and marking as set out in Schedule 14.

**Detection of orphan sources.**

60.(1) The competent authority shall ensure that arrangements are made, where appropriate, for-

- (a) raising general awareness of the possible occurrence of orphan sources and associated hazards; and
- (b) issuing guidance for persons who suspect or have knowledge of the presence of an orphan source on informing the competent authority and on the actions to be taken.

(2) The competent authority shall ensure that specialised technical advice and assistance is promptly made available to persons who-

- (a) are not normally involved in operations subject to radiation protection requirements; and
- (b) suspect the presence of an orphan source.

(3) The competent authority shall ensure that the primary aim of the advice and assistance provided under subregulation (2) is-

- (a) the safety of the source; and
- (b) protecting the public and workers from radiation.

**Metal contamination.**

61. Any undertaking with responsibility for a metal scrap recycling installation shall ensure that it promptly informs the competent authority if it suspects or has knowledge of any melting of or other metallurgical operation on an orphan source and shall require that the contaminated materials are not-

- (a) used;
- (b) placed for sale; or
- (c) disposed of without the involvement of the competent authority.

**Recovery, management, control and disposal of orphan sources.**

62.(1) The competent authority shall-

- (a) be prepared, or have made provision, including the assignment of responsibilities, to control and recover any orphan sources;
- (b) deal with emergencies due to orphan sources, having drawn up appropriate response plans and measures; and
- (c) ensure that actions are taken to recover orphan sources left behind from past authorised practices.

(2) The competent authority may recover any expenses reasonably incurred by it in the recovery and disposal of an orphan source from-

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- (a) the person carrying on the radioactive substance activity involving that source; or
- (b) the occupier or owner of the premises where the source is located.

**SCHEDULE 1**

**WORK NOT REQUIRED TO BE NOTIFIED UNDER  
REGULATION 7**

1. Work with ionising radiation is not required to be notified in accordance with regulation 7 when the only such work being carried out is in one or more of the following categories-

- (a) where the concentration of activity per unit mass of a radioactive substance does not exceed the concentration specified in column 2 of Part 1 of Schedule 8 (for artificial radionuclides and naturally occurring radionuclides which are processed for their radioactive, fissile or fertile properties) or column 2 of Part 2 of Schedule 8 (for naturally occurring radionuclides which are not processed for their radioactive, fissile or fertile properties);
- (b) where the quantity of radioactive substance involved does not exceed the quantity specified in column 3 of Part 1 of Schedule 8 (for artificial radionuclides and naturally occurring radionuclides which are processed for their radioactive, fissile or fertile properties) or column 3 of Part 2 of Schedule 8 (for naturally occurring radionuclides which are not processed for their radioactive, fissile or fertile properties);
- (c) where the concentration of activity per unit mass or quantity of a radioactive substance does not exceed values which may be approved by the competent authority for specific types of work and where such work satisfies the exemption criteria set out in paragraphs 2 and 3 below;
- (d) where apparatus contains radioactive substances in a quantity exceeding the values specified in subparagraphs (a) and (b) provided that-
  - (i) the apparatus is of a type approved by the competent authority,
  - (ii) the apparatus is constructed in the form of a sealed source,
  - (iii) the apparatus does not under normal operating conditions cause a dose rate of more than 1  $\mu$ Svh-1 at a distance of 0.1 m from any accessible surface, and
  - (iv) conditions for the disposal of the apparatus have been specified by the competent authority;
- (e) the operation of any electrical apparatus to which these Regulations apply other than apparatus referred to in subparagraph (f) provided that-

- (i) the apparatus is of a type approved by the competent authority, and
  - (ii) the apparatus does not under normal operating conditions cause a dose rate of more than  $1 \mu\text{Svh}^{-1}$  at a distance of 0.1 m from any accessible surface;
- (f) the operation of-
- (i) any cathode ray tube intended for the display of visual images, or
  - (ii) any other electrical apparatus operating at a potential difference not exceeding 30kV,

provided that the operation of the tube or apparatus does not under normal operating conditions cause a dose rate of more than  $1 \mu\text{Svh}^{-1}$  at a distance of 0.1 m from any accessible surface; or

- (g) where the work involves contaminated material resulting from authorised releases which the competent authority has declared not to be subject to further control.

2. The criteria for the exemption from notification of work with ionising radiation are as follows-

- (a) the radiological risks to individuals caused by such work are sufficiently low as to be of no regulatory concern;
- (b) work of such type has been found to be justified; and
- (c) such work is inherently safe.

3. Work with ionising radiation only meets the requirements of paragraph 2(a) if-

- (a) in relation to an employee, the effective dose caused by such work does not exceed 1 mSv in a calendar year; and
- (b) in relation to any other person, the following requirements are met in all circumstances where it is reasonably practicable to do so-
  - (i) the effective dose caused by such work from radionuclides which are not naturally occurring radionuclides does not exceed  $10 \mu\text{Sv}$  in a calendar year; and
  - (ii) the effective dose caused by such work from naturally occurring radionuclides does not exceed 1 mSv in a calendar year.



**SCHEDULE 1A**

**Consent to carry out a practice: indicative list of information**

1. Responsibilities and organisational arrangements for protection and safety.
2. Staff competences, including information and training.
3. Design features of the facility and of radiation sources.
4. Anticipated occupational and public exposures in normal operation.
5. Safety assessment of the activities and the facility in order to-
  - (a) identify ways in which potential exposures or accidental and unintended medical exposures could occur;
  - (b) estimate, to the extent practicable, the probabilities and magnitude of potential exposures;
  - (c) assess the quality and extent of protection and safety provisions, including engineering features, as well as administrative procedures;
  - (d) define the operational limits and conditions of operation.
6. Emergency procedures.
7. Maintenance, testing, inspection and servicing so as to ensure that the radiation source and the facility continue to meet the design requirements, operational limits and conditions of operation throughout their lifetime.
8. Management of radioactive waste and arrangements for the disposal of such waste, in accordance with applicable regulatory requirements.
9. Management of disused sources.
10. Quality assurance.

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**SCHEDULE 2**

Regulation 7(2)

**PARTICULARS TO BE PROVIDED IN A  
NOTIFICATION UNDER REGULATION 7(2)**

The following particulars shall be given in a notification under regulation 7(2)–

- (a) the name and address of the employer and a contact telephone or fax number or electronic mail address;
- (b) the address of the premises where or from where the work activity is to be carried out and a telephone or fax number or electronic mail address at such premises;
- (c) the nature of the business of the employer;
- (d) into which of the following categories the source or sources of ionising radiation fall-
  - (i) sealed source;
  - (ii) unsealed radioactive substance;
  - (iii) electrical equipment;
  - (iv) an atmosphere containing the short-lived daughters of radon 222;
- (e) whether or not any source is to be used at premises other than the address given at subparagraph (b) above; and
- (f) dates of notification and commencement of the work activity.

**SCHEDULE 3**

Regulation 7(3)

**ADDITIONAL PARTICULARS WHICH THE  
COMPETENT AUTHORITY MAY REQUIRE**

The following additional particulars may be required under regulation 7(3)-

- (a) a description of the work with ionising radiation;
- (b) particulars of the source or sources of ionising radiation including the type of electrical equipment used or operated and the nature of any radioactive substance;
- (c) the quantities of any radioactive substance involved in the work;
- (d) the identity of any person engaged in the work;
- (e) the date of commencement and the duration of any period over which the work is carried on;
- (f) the location and description of any premises at which the work is carried out on each occasion that it is so carried out;
- (g) the date of termination of the work;
- (h) further information on any of the particulars listed in Schedule 2.

**SCHEDULE 4**

Regulation 12

**DOSE LIMITS****PART I****CLASSES OF PERSONS TO WHOM DOSE LIMITS APPLY****Employees and trainees of 18 years of age or above.**

1. For the purposes of regulation 12(1), the limit on effective dose for any employee or trainee of 18 years of age or above shall be 20 mSv in any calendar year.

2. Without prejudice to paragraph 1-

- (a) the limit on equivalent dose for the lens of the eye is-
  - (i) 20 mSv in a calendar year, or
  - (ii) in accordance with conditions approved by the competent authority from time to time, 100 mSv in any period of five consecutive calendar years subject to a maximum equivalent dose of 50 mSv in any single calendar year;
- (b) the limit on equivalent dose for the skin is 500 mSv in a calendar year as applied to the dose averaged over any area of 1 cm<sup>2</sup> regardless of the area exposed;
- (c) the limit on equivalent dose for the extremities is 500 mSv in a calendar year.

**Trainees aged under 18 years.**

3. For the purposes of regulation 12(1), the limit on effective dose for any trainee under 18 years of age shall be 6 mSv in any calendar year.

4. Without prejudice to paragraph 3-

- (a) the limit on equivalent dose for the lens of the eye is 15 mSv in a calendar year;
- (b) the limit on equivalent dose for the skin is 150 mSv in a calendar year as applied to the dose averaged over any area of 1 cm<sup>2</sup> regardless of the area exposed;
- (c) the limit on equivalent dose for the extremities is 150 mSv in a calendar year.

5. *Deleted.*

**Other persons.**

6. Subject to paragraph 7, for the purposes of regulation 12(1) the limit on effective dose for any person other than an employee or trainee referred to in paragraph 1 or 3, including any person below the age of 16, shall be 1 mSv in any calendar year.

7. Paragraph 6 shall not apply in relation to any person (not being a comforter or carer) who may be exposed to ionising radiation resulting from the medical exposure of another and in such a case the limit on effective dose for any such person shall be 5 mSv in any period of 5 consecutive calendar years.

8. Without prejudice to paragraphs 6 and 7—

- (a) the limit on equivalent dose for the lens of the eye is 15 mSv in any calendar year;
- (b) the limit on equivalent dose for the skin is 50 mSv in any calendar year averaged over any 1 cm<sup>2</sup> area regardless of the area exposed;
- (c) the limit on equivalent dose for the extremities is 50 mSv in a calendar year.

**PART II**

9. For the purposes of regulation 12(2), the limit on effective dose for employees or trainees of 18 years or above shall be 100 mSv in any period of five consecutive calendar years subject to a maximum effective dose of 50 mSv in any single calendar year.

10. Without prejudice to paragraph 9—

- (a) the limit on equivalent dose for the lens of the eye is—
  - (i) 20 mSv in a calendar year, or
  - (ii) in accordance with conditions approved by the competent authority from time to time, 100 mSv in any period of five consecutive calendar years subject to a maximum equivalent dose of 50 mSv in any single calendar year;
- (b) the limit on equivalent dose for the skin is 500 mSv in a calendar year as applied to the dose averaged over any area of 1 cm<sup>2</sup> regardless of the area exposed;

- (c) the limit on equivalent dose for the extremities is 500 mSv in a calendar year.
11. *Deleted.*
12. The employer shall ensure that any employee in respect of whom regulation 12(2) applies is not exposed to ionising radiation to an extent that any dose limit specified in paragraphs 9 to 10 is exceeded.
13. An employer shall not put into effect a system of dose limitation in pursuance of regulation 12(2) unless—
- (a) the radiation protection adviser and any employees who are affected have been consulted;
  - (b) any employees affected and the approved dosimetry service have been informed in writing of the decision and of the reasons for that decision; and
  - (c) notice has been given to the competent authority at least 28 days (or such shorter period as the competent authority may allow) before the decision is put into effect giving the reasons for the decision.
14. Where there is reasonable cause to believe that any employee has been exposed to an effective dose greater than 20 mSv in any calendar year, the employer shall, as soon as is practicable—
- (a) undertake an investigation into the circumstances of the exposure for the purpose of determining whether the dose limit referred to in paragraph 9 is likely to be complied with; and
  - (b) notify the competent authority of that suspected exposure.
15. An employer shall review the decision to put into effect a system of dose limitation pursuant to regulation 12(2) at appropriate intervals and in any event not less than once every five years.
16. Where as a result of a review undertaken pursuant to paragraph 15 an employer proposes to revert to a system of annual dose limitation pursuant to regulation 12(1), the provisions of paragraph 13 shall apply as if the reference in that paragraph to regulation 12(2) was a reference to regulation 12(1).
17. Where an employer puts into effect a system of dose limitation in pursuance of regulation 12(2), he shall record the reasons for that decision and shall ensure that the record is preserved

until any person subject to that system of dose limitation has or would have attained the age of 75 years, but in any event for at least 30 years from the making of the record.

18. In any case where-

- (a) the dose limits specified in paragraph 9 are being applied by a radiation employer in respect of an employee; and
- (b) the competent authority is not satisfied that it is impracticable for that employee to be subject to the dose limit specified in paragraph 1 of Part I of this Schedule,

the authority may require the employer to apply the dose limit specified in paragraph 1 of Part I with effect from such time as the authority may consider appropriate, having regard to the interests of the employee concerned.

19. In any case where, as a result of a review undertaken pursuant to paragraph 15, an employer proposes to revert to an annual dose limitation in accordance with regulation 12(2), the competent authority may require the employer to defer the implementation of that decision to such time as the authority may consider appropriate, having regard to the interests of the employee concerned.

20. Any person who is aggrieved by the decision of the competent authority taken pursuant to paragraphs 18 or 19 may appeal to the Minister with responsibility for the Environment.

21. Subregulations (6) to (9) of regulation 6 shall apply for the purposes of paragraph 20 as they apply to an appeal under that regulation.

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**SCHEDULE 5**

Regulation 14(1)

**MATTERS IN RESPECT OF WHICH A RADIATION PROTECTION ADVISER  
MUST BE CONSULTED BY A RADIATION EMPLOYER**

1. The implementation of requirements as to controlled and supervised areas with a view to achieving an optimal level of protection for employees and members of the public.
2. The prior examination of plans for installations and the acceptance into service of new or modified sources of ionising radiation in relation to any engineering controls, design features, safety features and warning devices provided to restrict exposure to ionising radiation.
3. The regular calibration of equipment provided for monitoring levels of ionising radiation and the regular checking that such equipment is serviceable and correctly used.
4. The periodic examination and testing of engineering controls, design features, safety features and warning devices and regular checking of systems of work provided to restrict exposure to ionising radiation.



SCHEDULE 6

Regulation 23(6)

**PARTICULARS TO BE ENTERED IN THE RADIATION PASSBOOK**

1. Individual serial number of the passbook.
2. A statement that the passbook has been approved by the competent authority for the purposes of these Regulations.
3. Date of issue of the passbook by the approved dosimetry service.
4. The name, telephone number and mark of endorsement of the issuing approved dosimetry service.
5. The name, address, telephone and e-mail address of the employer.
6. Full name (surname and forenames), date of birth, gender and national insurance number of the outside worker to whom the passbook has been issued.
7. Date of the last medical review of the outside worker and the relevant classification in the health record maintained under regulation 26 as fit, fit subject to conditions (which conditions shall be specified) or unfit.
8. The relevant dose limits applicable to the outside worker to whom the passbook has been issued.
9. The cumulative dose assessment in mSv for the year to date for the outside worker, external (whole body, organ or tissue) and/or internal, as appropriate, and the date of the end of the last assessment period.
10. In respect of services performed by the outside worker-
  - (a) the name and address of the employer responsible for the controlled area;
  - (b) the period covered by the performance of the services;
  - (c) estimated dose information, which shall be, as appropriate-
    - (i) an estimate of any whole body effective dose in mSv received by the outside worker;

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- (ii) in the event of non-uniform exposure, an estimate of the equivalent dose in mSv to organs and tissues as appropriate; and
- (iii) in the event of internal contamination, an estimate of the activity taken in or the committed dose.

SCHEDULE 7

Regulation 26(3)

**PARTICULARS TO BE CONTAINED IN A HEALTH RECORD**

The following particulars shall be contained in a health record made for the purposes of regulation 26(3)-

- (a) the employee's-
  - (i) full name;
  - (ii) sex;
  - (iii) date of birth;
  - (iv) permanent address; and
  - (v) Identity card number;
- (b) the date of the employee's commencement as a classified person in present employment;
- (c) the nature of the employee's employment;
- (d) *Deleted.*
- (e) the date of last medical examination or health review carried out in respect of the employee;
- (f) the type of the last medical examination or health review carried out in respect of the employee;
- (g) a statement by the appointed doctor made as a result of the last medical examination or health review carried out in respect of the employee classifying the employee as fit, fit subject to conditions (which conditions shall be specified) or unfit;
- (h) Deleted.
- (i) in relation to each medical examination and health review, the name and signature of the appointed doctor;

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- (j) the name and address of the approved dosimetry service with whom arrangements have been made for maintaining the dose record in accordance with regulation 23.

## SCHEDULE 8

## Quantities and concentrations of radionuclides

## PART 1

Table of artificial radionuclides and naturally occurring radionuclides (which are processed for their radioactive, fissile or fertile properties)

1	2	3	4	5	6
Radionuclide name, symbol, isotope	Concentration for: Notification (any amount of radioactive material); Registration (amounts of radioactive material that exceed 1,000kg) (Bq/g)	Quantity for Notification (Bq)	Concentration for Registration (amounts of radioactive material that do not exceed 1,000kg) (Bq/g)	Quantity for notification of occurrences (Bq)	Quantity for notification of occurrences (Bq)
<b>Hydrogen</b>					
H-3 (tritiated compounds)	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>6</sup>	10 <sup>12</sup>	10 <sup>10</sup>
<b>Beryllium</b>					
Be-7	10	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
<b>Carbon</b>					
C-11	0.01	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
C-11 (monoxide)	0.01	10 <sup>9</sup>	10	10 <sup>12</sup>	10 <sup>10</sup>
C-11 (dioxide)	0.01	10 <sup>9</sup>	10	10 <sup>12</sup>	10 <sup>10</sup>
C-14	1	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>8</sup>
<b>Oxygen</b>					
O-15	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>10</sup>	
<b>Fluorine</b>					
F-18	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
<b>Sodium</b>					
Na-22	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Na-24	0.1	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Silicon</b>					
Si-31	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>13</sup>	10 <sup>7</sup>
<b>Phosphorus</b>					
P-32	10 <sup>3</sup>	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>6</sup>
P-33	10 <sup>3</sup>	10 <sup>8</sup>	10 <sup>5</sup>	10 <sup>11</sup>	10 <sup>9</sup>
<b>Sulphur</b>					
S-35	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>5</sup>	10 <sup>11</sup>	10 <sup>9</sup>
<b>Chlorine</b>					
Cl-36	1	10 <sup>6</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Cl-38	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
<b>Argon</b>					
Ar-37	0.01	10 <sup>8</sup>	10 <sup>6</sup>	10 <sup>13</sup>	
Ar-41	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>9</sup>	

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<b>Potassium</b>					
K-40 <sup>(1)</sup>	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
K-42	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
K-43	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
<b>Calcium</b>					
Ca-45	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Ca-47	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
<b>Scandium</b>					
Sc-46	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Sc-47	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Sc-48	1	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Vanadium</b>					
V-48	1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
<b>Chromium</b>					
Cr-51	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
<b>Manganese</b>					
Mn-51	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
Mn-52	1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Mn-52m	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
Mn-53	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>4</sup>	10 <sup>12</sup>	10 <sup>10</sup>
Mn-54	0.1	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Mn-56	10	10 <sup>5</sup>	10	10 <sup>12</sup>	10 <sup>6</sup>
<b>Iron</b>					
Fe-52+	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
Fe-55	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Fe-59	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
<b>Cobalt</b>					
Co-55	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Co-56	0.1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Co-57	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Co-58	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Co-58m	10 <sup>4</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>13</sup>	10 <sup>8</sup>
Co-60	0.1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Co-60m	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>16</sup>	10 <sup>7</sup>
Co-61	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
Co-62m	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
<b>Nickel</b>					
Ni-59	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>9</sup>
Ni-63	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>5</sup>	10 <sup>11</sup>	10 <sup>9</sup>
Ni-65	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
<b>Copper</b>					
Cu-64	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Zinc</b>					
Zn-65	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Zn-69	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>4</sup>	10 <sup>14</sup>	10 <sup>7</sup>
Zn-69m+	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Gallium</b>					
Ga-68	0.01	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
Ga-72	10	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Germanium</b>					
Ge-68+	0.01	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Ge-71	10 <sup>4</sup>	10 <sup>8</sup>	10 <sup>4</sup>	10 <sup>13</sup>	10 <sup>9</sup>
<b>Arsenic</b>					
As-73	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
As-74	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
As-76	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>6</sup>
As-77	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Selenium</b>					
Se-75	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Bromine</b>					

Br-82	1	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
<b>Krypton</b>					
Kr-74	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>9</sup>	
Kr-76	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>10</sup>	
Kr-77	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>9</sup>	
Kr-79	0.01	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>10</sup>	
Kr-81	0.01	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	
Kr-83m	0.01	10 <sup>12</sup>	10 <sup>5</sup>	10 <sup>12</sup>	
Kr-85	0.01	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>12</sup>	
Kr-85m	0.01	10 <sup>10</sup>	10 <sup>3</sup>	10 <sup>10</sup>	
Kr-87	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>9</sup>	
Kr-88	0.01	10 <sup>9</sup>	10 <sup>2</sup>	10 <sup>9</sup>	
<b>Rubidium</b>					
Rb-86	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>6</sup>
<b>Strontium</b>					
Sr-85	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Sr-85m	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>8</sup>
Sr-87m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
Sr-89	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Sr-90+	1	10 <sup>4</sup>	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>5</sup>
Sr-91+	10	10 <sup>5</sup>	10	10 <sup>12</sup>	10 <sup>6</sup>
Sr-92	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
<b>Yttrium</b>					
Y-90	10 <sup>3</sup>	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>6</sup>
Y-91	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Y-91m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
Y-92	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>6</sup>
Y-93	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>6</sup>
<b>Zirconium</b>					
Zr-93+	10	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>9</sup>	10 <sup>8</sup>
Zr-95+	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Zr-97+	10	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Niobium</b>					
Nb-93m	10	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Nb-94	0.1	10 <sup>6</sup>	10	10 <sup>9</sup>	10 <sup>7</sup>
Nb-95	1	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Nb-97+	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
Nb-98	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
<b>Molybdenum</b>					
Mo-90	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
Mo-93	10	10 <sup>8</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>9</sup>
Mo-99+	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Mo-101+	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
<b>Technetium</b>					
Tc-96	1	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Tc-96m	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>14</sup>	10 <sup>8</sup>
Tc-97	10	10 <sup>8</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>9</sup>
Tc-97m	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Tc-99	1	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Tc-99m	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>8</sup>
<b>Ruthenium</b>					
Ru-97	10	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>8</sup>
Ru-103+	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Ru-105+	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
Ru-106+	0.1	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>6</sup>
<b>Rhodium</b>					
Rh-103m	10 <sup>4</sup>	10 <sup>8</sup>	10 <sup>4</sup>	10 <sup>15</sup>	10 <sup>9</sup>
Rh-105	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>8</sup>
<b>Palladium</b>					
Pd-103+	10 <sup>3</sup>	10 <sup>8</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>9</sup>

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Pd-109+	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Silver</b>					
Ag-105	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Ag-108m+	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Ag-110m+	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Ag-111	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Cadmium</b>					
Cd-109+	1	10 <sup>6</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Cd-115+	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Cd-115m+	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
<b>Indium</b>					
In-111	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
In-113m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
In-114m+	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
In-115m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
<b>Tin</b>					
Sn-113+	1	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Sn-125	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>6</sup>
<b>Antimony</b>					
Sb-122	10	10 <sup>4</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>5</sup>
Sb-124	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Sb-125+	0.1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
<b>Tellurium</b>					
Te-123m	1	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Te-125m	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Te-127	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Te-127m+	10	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Te-129	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>14</sup>	10 <sup>7</sup>
Te-129m+	10	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Te-131	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>14</sup>	10 <sup>6</sup>
Te-131m+	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Te-132+	1	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Te-133	10	10 <sup>5</sup>	10	10 <sup>14</sup>	10 <sup>6</sup>
Te-133m	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
Te-134	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
<b>Iodine</b>					
I-123	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>8</sup>
I-125	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
I-126	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
I-129	0.01	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>6</sup>
I-130	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
I-131	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>7</sup>
I-132	10	10 <sup>5</sup>	10	10 <sup>12</sup>	10 <sup>6</sup>
I-133	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
I-134	10	10 <sup>5</sup>	10	10 <sup>13</sup>	10 <sup>6</sup>
I-135	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
<b>Xenon</b>					
Xe-131m	0.01	10 <sup>4</sup>	10 <sup>4</sup>	10 <sup>11</sup>	
Xe-133	0.01	10 <sup>4</sup>	10 <sup>3</sup>	10 <sup>11</sup>	
Xe-135	0.01	10 <sup>10</sup>	10 <sup>3</sup>	10 <sup>10</sup>	
<b>Caesium</b>					
Cs-129	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>6</sup>
Cs-131	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Cs-132	10	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
Cs-134	0.1	10 <sup>4</sup>	10	10 <sup>10</sup>	10 <sup>5</sup>
Cs-134m	10 <sup>3</sup>	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>14</sup>	10 <sup>6</sup>
Cs-135	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Cs-136	1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Cs-137+	0.1	10 <sup>4</sup>	10	10 <sup>10</sup>	10 <sup>5</sup>



Cs-138	10	10 <sup>4</sup>	10	10 <sup>13</sup>	10 <sup>5</sup>
<b>Barium</b>					
Ba-131	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Ba-140+	1	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Lanthanum</b>					
La-140	1	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Cerium</b>					
Ce-139	1	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Ce-141	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Ce-143	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Ce-144+	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>6</sup>
<b>Praseodymium</b>					
Pr-142	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>6</sup>
Pr-143	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Neodymium</b>					
Nd-147	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Nd-149	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
<b>Promethium</b>					
Pm-147	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Pm-149	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Samarium</b>					
Sm-151	10 <sup>3</sup>	10 <sup>8</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>9</sup>
Sm-153	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Europium</b>					
Eu-152	0.1	10 <sup>6</sup>	10	10 <sup>9</sup>	10 <sup>7</sup>
Eu-152m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Eu-154	0.1	10 <sup>6</sup>	10	10 <sup>9</sup>	10 <sup>7</sup>
Eu-155	1	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
<b>Gadolinium</b>					
Gd-153	10	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Gd-159	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Terbium</b>					
Tb-160	1	10 <sup>6</sup>	1	10 <sup>10</sup>	10 <sup>7</sup>
<b>Dysprosium</b>					
Dy-165	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>13</sup>	10 <sup>7</sup>
Dy-166	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Holmium</b>					
Ho-166	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>6</sup>
<b>Erbium</b>					
Er-169	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Er-171	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Thulium</b>					
Tm-170	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Tm-171	10 <sup>3</sup>	10 <sup>8</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>9</sup>
<b>Ytterbium</b>					
Yb-175	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
<b>Lutetium</b>					
Lu-177	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
<b>Hafnium</b>					
Hf-181	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
<b>Tantalum</b>					
Ta-182	0.1	10 <sup>4</sup>	10	10 <sup>10</sup>	10 <sup>5</sup>
<b>Tungsten</b>					
W-181	10	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
W-185	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>8</sup>
W-187	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
<b>Rhenium</b>					
Re-186	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Re-188	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>6</sup>
<b>Osmium</b>					
Os-185	1	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>

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Os-191	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Os-191m	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
Os-193	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Iridium</b>					
Ir-190	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Ir-192	1	10 <sup>4</sup>	10	10 <sup>10</sup>	10 <sup>5</sup>
Ir-194	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>6</sup>
<b>Platinum</b>					
Pt-191	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Pt-193m	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
Pt-197	10	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Pt-197m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>14</sup>	10 <sup>7</sup>
<b>Gold</b>					
Au-198	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Au-199	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
<b>Mercury</b>					
Hg-197	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>8</sup>
Hg-197m	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Hg-203	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>6</sup>
<b>Thallium</b>					
Tl-200	10	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Tl-201	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Tl-202	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
Tl-204	1	10 <sup>4</sup>	10 <sup>4</sup>	10 <sup>11</sup>	10 <sup>5</sup>
<b>Lead</b>					
Pb-203	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>12</sup>	10 <sup>7</sup>
Pb-210+	0.01	10 <sup>4</sup>	10	10 <sup>8</sup>	10 <sup>5</sup>
Pb-212+	1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
<b>Bismuth</b>					
Bi-206	1	10 <sup>5</sup>	10	10 <sup>10</sup>	10 <sup>6</sup>
Bi-207	0.1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
Bi-210	10	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>9</sup>	10 <sup>7</sup>
Bi-212+	1	10 <sup>5</sup>	10	10 <sup>11</sup>	10 <sup>6</sup>
<b>Polonium</b>					
Po-203	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
Po-205	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
Po-207	10	10 <sup>6</sup>	10	10 <sup>12</sup>	10 <sup>7</sup>
Po-210	0.01	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
<b>Astatine</b>					
At-211	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>8</sup>
<b>Radon</b>					
Rn-220+	0.01	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>8</sup>	10 <sup>8</sup>
Rn-222+	0.01	10 <sup>8</sup>	10	10 <sup>9</sup>	10 <sup>9</sup>
<b>Radium</b>					
Ra-223+	1	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>6</sup>
Ra-224+	1	10 <sup>5</sup>	10	10 <sup>8</sup>	10 <sup>6</sup>
Ra-225	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>6</sup>
Ra-226+	0.01	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Ra-227	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>13</sup>	10 <sup>7</sup>
Ra-228+	0.01	10 <sup>5</sup>	10	10 <sup>8</sup>	10 <sup>6</sup>
<b>Actinium</b>					
Ac-228	1	10 <sup>6</sup>	10	10 <sup>10</sup>	10 <sup>7</sup>
<b>Thorium</b>					
Th-226+	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Th-227	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Th-228+	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Th-229+	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Th-230	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Th-231	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
Th-232	0.01	10 <sup>4</sup>	10	10 <sup>6</sup>	10 <sup>5</sup>
Th-234+	10	10 <sup>5</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>6</sup>

Protactinium					
Pa-230	10	10 <sup>6</sup>	10	10 <sup>8</sup>	10 <sup>7</sup>
Pa-231	0.01	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Pa-233	10	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Uranium					
U-230+	10	10 <sup>5</sup>	10	10 <sup>7</sup>	10 <sup>6</sup>
U-231	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>8</sup>
U-232+	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
U-233	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
U-234	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
U-235+	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
U-236	10	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
U-237	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>7</sup>
U-238+	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
U-239	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>14</sup>	10 <sup>7</sup>
U-240	0.01	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>12</sup>	10 <sup>8</sup>
U-240+	10 <sup>2</sup>	10 <sup>6</sup>	10	10 <sup>11</sup>	10 <sup>7</sup>
Neptunium					
Np-237+	1	10 <sup>3</sup>	1	10 <sup>7</sup>	10 <sup>4</sup>
Np-239	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Np-240	10	10 <sup>6</sup>	10	10 <sup>13</sup>	10 <sup>7</sup>
Plutonium					
Pu-234	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Pu-235	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>2</sup>	10 <sup>14</sup>	10 <sup>8</sup>
Pu-236	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Pu-237	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>11</sup>	10 <sup>8</sup>
Pu-238	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Pu-239	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Pu-240	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Pu-241	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>6</sup>
Pu-242	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Pu-243	10 <sup>3</sup>	10 <sup>7</sup>	10 <sup>3</sup>	10 <sup>13</sup>	10 <sup>8</sup>
Pu-244+	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Americium					
Am-241	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Am-242	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>10</sup>	10 <sup>7</sup>
Am-242m+	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Am-243+	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Curium					
Cm-242	10	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>7</sup>	10 <sup>6</sup>
Cm-243	1	10 <sup>4</sup>	1	10 <sup>7</sup>	10 <sup>5</sup>
Cm-244	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Cm-245	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Cm-246	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Cm-247+	0.1	10 <sup>4</sup>	1	10 <sup>6</sup>	10 <sup>5</sup>
Cm-248	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Berkelium					
Bk-249	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>9</sup>	10 <sup>7</sup>
Californium					
Cf-246	10 <sup>3</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>9</sup>	10 <sup>7</sup>
Cf-248	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Cf-249	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Cf-250	1	10 <sup>4</sup>	10	10 <sup>6</sup>	10 <sup>5</sup>
Cf-251	0.1	10 <sup>3</sup>	1	10 <sup>6</sup>	10 <sup>4</sup>
Cf-252	1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Cf-253	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>6</sup>
Cf-254	1	10 <sup>3</sup>	1	10 <sup>7</sup>	10 <sup>4</sup>
Einsteinium					
Es-253	10 <sup>2</sup>	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>8</sup>	10 <sup>6</sup>
Es-254+	0.1	10 <sup>4</sup>	10	10 <sup>7</sup>	10 <sup>5</sup>
Es-254m+	10	10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>9</sup>	10 <sup>7</sup>

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<b>Fermium</b>					
Fm-254	10 <sup>4</sup>	10 <sup>7</sup>	10 <sup>4</sup>	10 <sup>10</sup>	10 <sup>8</sup>
Fm-255	10 <sup>2</sup>	10 <sup>6</sup>	10 <sup>3</sup>	10 <sup>9</sup>	10 <sup>7</sup>
<b>Other radionuclides not listed above (see Note 1)</b>					
	0.01	10 <sup>3</sup>	0.1	10 <sup>5</sup>	10 <sup>4</sup>
Note 1					
In the case of radionuclides not specified elsewhere in this Part, the quantities specified in this entry are to be used unless the Executive has approved some other quantity for that radionuclide.					
Note 2					
Nuclides carrying the suffix “+” in the above table represent parent nuclides and their progeny as listed in the table below. The dose contributions for those progeny are taken into account in the dose calculation (thus requiring only the exemption level of the parent radionuclide to be considered).					

(<sup>1</sup>) Potassium salts in quantities less than 1,000kg are exempt.

**List of parent nuclides and their progeny as referred to in Note 2 above**

<b>Parent radionuclide</b>	<b>Progeny</b>
Fe-52	Mn-52m
Zn-69m	Zn-69
Ge-68	Ga-68
Sr-90	Y-90
Sr-91	Y-91m
Zr-93	Nb-93m
Zr-95	Nb-95
Zr-97	Nb-97m, Nb-97
Nb-97	Nb-97m
Mo-99	Tc-99m
Mo-101	Tc-101
Ru-103	Rh-103m
Ru-105	Rh-105m
Ru-106	Rh-106

Parent radionuclide	Progeny
Pd-103	Rh-103m
Pd-109	Ag-109m
Ag-108m	Ag-108
Ag-110m	Ag-110
Cd-109	Ag-109m
Cd-115	In-115m
Cd-115m	In-115m
In-114m	In-114
Sn-113	In-113m
Sb-125	Te-125m
Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
Cs-137	Ba-137m
Ba-140	La-140
Ce-144	Pr-144, Pr-144m
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-212	Tl-208, Po-212
Rn-220	Po-216
Rn-222	Po-218, Pb-214, Bi-214, Po-214

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<b>Parent radionuclide</b>	<b>Progeny</b>
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-226	Ra-222, Rn-218, Po-214
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
U-235	Th-231
U-238	Th-234, Pa-234m
U-240	Np-240m, Np-240
Np-237	Pa-233
Pu-244	U-240, Np-240m, Np-240
Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Es-254	Bk-250
Es-254m	Fm-254

**PART 2**

**Table of naturally occurring radionuclides (which are not processed for their radioactive, fissile or fertile properties)**

Values for exemption from notification and registration for naturally occurring radionuclides in solid materials (which are not processed for their radioactive, fissile or fertile properties), which apply whether or not the radionuclide is in secular equilibrium with its progeny.

1	2	3	4
<i>Radionuclide name, symbol, isotope</i>	<i>Concentration for: Notification (any amount of radioactive material); Registration (amounts of radioactive material that exceed 1,000kg)</i>  <i>(Bq/g)</i>	<i>Quantity for Notification</i>  <i>(Bq)</i>	<i>Concentration for Registration (amounts of radioactive material that do not exceed 1,000kg)</i>  <i>(Bq/g)</i>
K-40 <sup>(1)</sup>	10	10 <sup>6</sup>	10 <sup>2</sup>
Rb-87	1	10 <sup>7</sup>	10 <sup>4</sup>
Pb-210+	1	10 <sup>4</sup>	10
Po-210	1	10 <sup>4</sup>	10
Ra-226+	1	10 <sup>4</sup>	10
Ra-228+	1	10 <sup>5</sup>	10
Th-228+	1	10 <sup>4</sup>	1
Th-232 sec	1	10 <sup>3</sup>	1
U-238 sec	1	10 <sup>3</sup>	1
<p>Note:</p> <p>Nuclides carrying the suffix “+” in the above table represent parent nuclides and their progeny as listed in the table below. The dose contributions of those progeny are taken into account in the dose calculation (thus requiring only the exemption level of the parent radionuclide to be considered).</p>			

<sup>(1)</sup> Potassium salts in quantities less than 1,000kg are exempt.

## List of parent nuclides and their progeny as referred to in the Note above

<i>Parent radionuclide</i>	<i>Progeny</i>
Pb-210	Bi-210, Po-210
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212

## PART 3

## Quantity and concentration ratios for more than one radionuclide

1. For the purpose of Regulation 2(4)-

- (a) the quantity ratio for more than one radionuclide is the sum of the quotients of the quantity of a radionuclide present  $Q_p$  divided by the quantity of that radionuclide specified in the appropriate entry in Parts 1, 2 or 4 of this Schedule  $Q_{lim}$ , namely-

$$\sum Q_p/Q_{lim}$$

- (b) (the concentration ratio for more than one radionuclide is the sum of the quotients of the concentration of a radionuclide present  $C_p$  divided by the concentration of that radionuclide specified in the appropriate entry in Parts 1 or 2 of this Schedule  $C_{lim}$ , namely-

$$\sum C_p/C_{lim}$$

2. In any case where the isotopic composition of a radioactive substance is not known or is only partially known, the quantity or concentration ratio for that substance is to be calculated by using the values specified in the appropriate column in Part 1 of this Schedule for "other radionuclides not listed above" for any radionuclide that has not been identified or where the quantity or concentration of a radionuclide is uncertain, unless the employer can show that the use of some other value is appropriate in the circumstances of a particular case, when the employer may use that value."



## SCHEDULE 9

## Activity values defining high-activity sealed sources

For radionuclides not listed in the table below, the relevant activity is identical to the D-value defined in the IAEA publication Dangerous quantities of radioactive material (D-values), (EPR-D-VALUES 2006).

Radionuclide Activity (TBq)	Radionuclide Activity (TBq)
Am-241	$6 \times 10^{-2}$
Am-241/Be-9 <sup>(1)</sup>	$6 \times 10^{-2}$
Cf-252	$2 \times 10^{-2}$
Cm-244	$5 \times 10^{-2}$
Co-60	$3 \times 10^{-2}$
Cs-137	$1 \times 10^{-1}$
Gd-153	$1 \times 10^0$
Ir-192	$8 \times 10^{-2}$
Pm-147	$4 \times 10^1$
Pu-238	$6 \times 10^{-2}$
Pu-239/Be-9 <sup>(1)</sup>	$6 \times 10^{-2}$
Ra-226	$4 \times 10^{-2}$
Se-75	$2 \times 10^{-1}$
Sr-90 (Y-90)	$1 \times 10^0$
Tm-170	$2 \times 10^1$
Yb-169	$3 \times 10^{-1}$
<sup>(1)</sup> The activity given is that of the alpha-emitting radionuclide	

## SCHEDULE 10

*Deleted.*

## SCHEDULE 11

## Radiation and tissue weighting factors

1. For the definition of “effective dose” at regulation 2-

$D_{T,R}$  is the absorbed dose averaged over tissue or organ T, due to radiation R;

$w_R$  is the radiation weighting factor; and

$w_T$  is the tissue weighting factor for tissue or organ T.

The values for  $w_T$  and  $w_R$  are specified in the tables below, and the unit for effective dose is the sievert (Sv).

2. For the definition of “equivalent dose” at regulation 2-

$D_{T,R}$  is the absorbed dose averaged over tissue or organ T, due to radiation R;

$w_R$  is the radiation weighting factor,

When the radiation field is composed of types and energies with different values of  $w_R$ , the total equivalent dose,  $H_T$ , is given by-

$$H_T = \sum_R w_R D_{T,R}$$

The values for  $w_R$  are specified in table A below, and the unit for effective dose is the sievert (Sv).

**Table A: Radiation weighting factors**

Radiation type	$w_R$
Photons	1
Electrons and muons	1
Protons and charged pions	2
Alpha particles, fission fragments, heavy ions	20
Neutrons, $E_n < 1$ MeV	$2,5 + 18,2e^{-[\ln(E_n)]^2/6}$
Neutrons, $1 \text{ MeV} \leq E_n \leq 50 \text{ MeV}$	$5,0 + 17,0e^{-[\ln(2E_n)]^2/6}$

Neutrons, $E_n > 50 \text{ MeV}$	$2,5 + 3,25 e^{-[\ln(0,04 E_n)]^2 / 6}$
Note: All values relate to the radiation incident on the body or, for internal radiation sources, emitted from the incorporated radionuclide(s).	

**Table B: Tissue weighting factors**

Tissue	WT
Bone-marrow (red)	0,12
Colon	0,12
Lung	0,12
Stomach	0,12
Breast	0,12
Remainder tissues <sup>(1)</sup>	0,12
Gonads	0,08
Bladder	0,04
Oesophagus	0,04
Liver	0,04
Thyroid	0,04
Bone surface	0,01
Brain	0,01
Salivary glands	0,01
Skin	0,01

**1995-09**

**Health Protection (Ionising Radiation)**

**2004/088**

**Ionising Radiation Regulations 2004**

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**SCHEDULE 12**

**List of industrial sectors involving naturally-occurring radioactive material**

When applying regulation 4A the following list of industrial sectors involving naturally-occurring radioactive material, including research and relevant secondary processes, shall be taken into account-

- Extraction of rare earths from monazite
- Production of thorium compounds and manufacture of thorium-containing products
- Processing of niobium/tantalum ore
- Oil and gas production
- Geothermal energy production
- TiO<sub>2</sub> pigment production
- Thermal phosphorus production
- Zircon and zirconium industry
- Production of phosphate fertilisers
- Cement production, maintenance of clinker ovens
- Coal-fired power plants, maintenance of boilers
- Phosphoric acid production,
- Primary iron production,
- Tin/lead/copper smelting,
- Ground water filtration facilities,
- Mining of ores other than uranium ore.

**SCHEDULE 13**

**Indicative list of types of existing exposure situations**

- (a) Exposure due to contamination of areas by residual radioactive material from-
  - (i) past activities that were never subject to regulatory control or were not regulated in accordance with the requirements laid down by the Directive,
  - (ii) an emergency, after the emergency exposure situation has been declared ended, as provided for in the off-site emergency response plan,
  - (iii) residues from past activities for which the undertaking is no longer legally accountable;
- (b) Exposure to natural radiation sources, including-
  - (i) indoor exposure to radon and thoron, in workplaces, dwellings and other buildings,
  - (ii) indoor external exposure from building materials;
- (c) Exposure to commodities excluding food, animal feeding stuffs and drinking water incorporating-
  - (i) radionuclides from contaminated areas specified in paragraph (a), or
  - (ii) naturally-occurring radionuclides.

**SCHEDULE 14****Identification and marking of high-activity sealed sources**

1. The manufacturer or supplier ensures that-

- (a) Each high-activity sealed source is identified by a unique number. This number shall be engraved or stamped on the source, where practicable.

The number shall also be engraved or stamped on the source container. If this is not feasible, or in the case of reusable transport containers, the source container shall, at least, bear information on the nature of the source.

- (b) The source container and, where practicable, the source are marked and labelled with an appropriate sign to warn people of the radiation hazard.

2. The manufacturer provides a photograph of each manufactured source design type and a photograph of the typical source container.

3. The undertaking ensures that each high-activity sealed source is accompanied by written information indicating that the source is identified and marked in compliance with point 1 and that the markings and labels referred to in point 1 remain legible. The information shall include photographs of the source, source container, transport packaging, device and equipment as appropriate.

**SCHEDULE 15**

**Reference levels for public exposure**

1. Without prejudice to reference levels set for equivalent doses, reference levels expressed in effective doses shall be set in the range of 1 to 20 mSv per year for existing exposure situations and 20 to 100 mSv (acute or annual) for emergency exposure situations.
2. In specific situations, a reference level below ranges referred to in point 1 may be considered, in particular-
  - (a) a reference level below 20 mSv may be set in an emergency exposure situation where appropriate protection can be provided without causing a disproportionate detriment from the corresponding countermeasures or an excessive cost;
  - (b) a reference level below 1 mSv per year may be set, where appropriate, in an existing exposure situation for specific source-related exposures or pathways of exposure.
3. For the transition from an emergency exposure situation to an existing exposure situation, appropriate reference levels shall be set, in particular upon the termination of long-term countermeasures such as relocation.
4. The reference levels set shall take account of the features of prevailing situations as well as societal criteria, which may include the following-
  - (a) for exposures below or equal to 1 mSv per year, general information on the level of exposure, without specific consideration of individual exposures;
  - (b) in the range up to or equal to 20 mSv per year, specific information to enable individuals to manage their own exposure, if possible;
  - (c) in the range up to or equal to 100 mSv per year, assessment of individual doses and specific information on radiation risks and on available actions to reduce exposures.

**SCHEDULE 16****List of items to be considered in preparing the national action plan to address long-term risks from radon exposures**

1. Strategy for conducting surveys of indoor radon concentrations or soil gas concentrations for the purpose of estimating the distribution of indoor radon concentrations, for the management of measurement data and for the establishment of other relevant parameters (such as soil and rock types, permeability and radium-226 content of rock or soil).
2. Approach, data and criteria used for the delineation of areas or for the definition of other parameters that can be used as specific indicators of situations with potentially high exposure to radon.
3. Identification of types of workplaces and buildings with public access, such as schools, underground workplaces, and those in certain areas, where measurements are required, on the basis of a risk assessment, considering for instance occupancy hours.
4. The basis for the establishment of reference levels for dwellings and workplaces. If applicable, the basis for the establishment of different reference levels for different uses of buildings (dwellings, buildings with public access, workplaces) as well as for existing and for new buildings.
5. Assignment of responsibilities (governmental and non-governmental), coordination mechanisms and available resources for implementation of the action plan.
6. Strategy for reducing radon exposure in dwellings and for giving priority to addressing the situations identified under point 2.
7. Strategies for facilitating post construction remedial action.
8. Strategy, including methods and tools, for preventing radon ingress in new buildings, including identification of building materials with significant radon exhalation.
9. Schedules for reviews of the action plan.
10. Strategy for communication to increase public awareness and inform local decision makers, employers and employees of the risks of radon, including in relation to smoking.
11. Guidance on methods and tools for measurements and remedial measures. Criteria for the accreditation of measurement and remediation services shall also be considered.



12. Where appropriate, provision of financial support for radon surveys and for remedial measures, in particular for private dwellings with very high radon concentrations.
13. Long-term goals in terms of reducing lung cancer risk attributable to radon exposure (for smokers and non- smokers).
14. Where appropriate, consideration of other related issues and corresponding programmes such as programmes on energy saving and indoor air quality.

**SCHEDULE 17****Indicative list of types of building materials considered with regard to their emitted gamma radiation**

## 1. Natural materials

- (a) Alum-shale.
- (b) Building materials or additives of natural igneous origin, such as-
  - granitoides (such as granites, syenite and orthogneiss),
  - porphyries,
  - tuff,
  - pozzolana (pozzolanic ash),
  - lava.

## 2. Materials incorporating residues from industries processing naturally occurring radioactive material, such as-

- fly ash;
- phosphogypsum;
- phosphorus slag;
- tin slag;
- copper slag;
- red mud (residue from aluminium production);
- residues from steel production.

## SCHEDULE 18

**Definition and use of the activity concentration index for the gamma radiation emitted by building materials**

For the purposes of regulation 16F(2), for identified types of building materials, the activity concentrations of primordial radionuclides Ra-226, Th-232 (or its decay product Ra-228) and K-40 shall be determined.

The activity concentration index **I** is given by the following formula-

$$I = C_{\text{Ra226}}/300 \text{ Bq/kg} + C_{\text{Th232}}/200 \text{ Bq/kg} + C_{\text{K40}}/3\ 000 \text{ Bq/kg}$$

where  $C_{\text{Ra226}}$ ,  $C_{\text{Th232}}$  and  $C_{\text{K40}}$  are the activity concentrations in Bq/kg of the corresponding radionuclides in the building material.

The index relates to the gamma radiation dose, in excess of typical outdoor exposure, in a building constructed from a specified building material. The index applies to the building material, not to its constituents except when those constituents are building materials themselves and are separately assessed as such. For application of the index to such constituents, in particular residues from industries processing naturally-occurring radioactive material recycled into building materials, an appropriate partitioning factor needs to be applied. The activity concentration index value of 1 can be used as a conservative screening tool for identifying materials that may cause the reference level laid down in regulation 16F(1) to be exceeded. The calculation of dose needs to take into account other factors such as density, thickness of the material as well as factors relating to the type of building and the intended use of the material (bulk or superficial).