
STATUTORY INSTRUMENTS

2019 No. 0000

HEALTH AND SAFETY

The Radiation (Emergency Preparedness and Public Information) Regulations 2019

<i>Made</i>	- - - -	***
<i>Laid before Parliament</i>		***
<i>Coming into force</i>	- -	***

The Secretary of State makes these Regulations in exercise of the powers conferred by sections 15(1) and (1B), (2), (3)(a) and (c), (4), (5)(b), (6)(a), 18(2)(za), 43(2), (4), (5) and (6), and 82(3)(a) of, and paragraphs 13, 15, 16, 18 and 20 of Schedule 3 to, the Health and Safety at Work Act 1974(a) (“the 1974 Act”).

The Secretary of State makes these Regulations independently of any proposals made by the Health and Safety Executive, as provided by section 50(1)(b) of the 1974 Act having consulted, in accordance with section 50(1AA)—

- (a) the Executive;
- (b) the Office for Nuclear Regulation; and
- (c) such other persons as appeared to the Secretary of State to be appropriate.

Citation and commencement

1. These Regulations may be cited as the Radiation (Emergency Preparedness and Public Information) Regulations 2019 and come into force on ****.

Interpretation

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

“the 2017 Regulations” means the Ionising Radiations Regulations 2017(b);

“the Agency” in relation to premises or a plan relating to premises—

- (a) in England, means the Environment Agency,
- (b) in Wales, means Natural Resources Wales, and
- (c) in Scotland, means the Scottish Environment Protection Agency;

(a) 1974 c. 37. Section 15(1) was substituted by paragraph 6 of Schedule 15 to the Employment Protection Act 1975 (c. 71) and amended by S.I. 2002/794. Section 15(1B) was inserted by and (2) and (3)(c) amended by paragraph 5 of Schedule 12 to the Energy Act 2013 (c. 32). Section 15(4)(a) was amended by S.I. 2008/960. Section 18(2)(za) was inserted by paragraph 6 of Schedule 12 to the Energy Act 2013. Section 43(6) was substituted by paragraph 12 of Schedule 15 to the Employment Protection Act 1975 and amended by S.I. 2002/794.

(b) S.I. 2017/1075.

“approved dosimetry service” means an approved dosimetry service within the meaning of the 2017 Regulations and which is approved for the purpose of regulation 22 of those Regulations;

“Category 1 responder” has the meaning set out in Parts 1 and 2 of Schedule 1 to the Civil Contingencies Act 2004(a);

“Category 2 responder” has the meaning set out in Parts 3 and 4 of Schedule 1 to the Civil Contingencies Act 2004(b)

“consequences report” has the meaning set out in regulation 7(1);

“detailed emergency planning zone” means a zone determined in accordance with regulation 8 and covered by the local authority’s off-site emergency plan;

“dose assessment” means the dose assessment made and recorded by an approved dosimetry service in accordance with regulation 22 of the 2017 Regulations;

“dose consequences” means the consequences to an individual of being exposed to a specific quantity of radiation as the result of a radiation emergency;

“dose record” means the record made and maintained in respect of an employee by the approved dosimetry service in accordance with regulation 22 of the 2017 Regulations;

“emergency exposure” means an exposure of an employee engaged in an activity of or associated with the response to a radiation emergency or potential radiation emergency in order to bring help to endangered persons, prevent exposure of other persons or save a valuable installation or goods, whereby one of the individual dose limits referred to in regulation 12 of the 2017 Regulations could be exceeded;

“emergency services” means—

- (a) those police, fire and ambulance services who are likely to be required to respond to a radiation emergency which has occurred at the premises of an operator, and
- (b) where appropriate, Her Majesty’s Coastguard;

“emergency worker” means—

- (a) a Category 1 responder who has a defined role in an operator or local authority off-site emergency plan,
- (b) a person employed by the operator of a site to which these Regulations apply (whether or not employed at that site) and who has a defined role in the operator’s emergency plan,
- (c) a person employed, whether or not by an operator, to assist in the transition of that operator’s site from an emergency state, and
- (d) any other person or organisation who is identified in an emergency plan as having a role in providing assistance in the handling of a radiation emergency;

“existing exposure situation” means an exposure situation that already exists before the occurrence of a radiation emergency and which does not call or no longer calls for the implementation of any measures from an emergency plan;

“health authority” means—

- (a) in relation to England, a clinical commissioning group established under section 14D of the National Health Service Act 2006(c),

(a) 2004 c. 36. Paragraph 1A was inserted by article 2 of S.I. 2011/1233. Parts 1 and 2 of Schedule 1 have also been amended by paragraph 27 of Schedule 1 to the Health Service (Consequential Provisions) Act 2006 (c. 43), section 312 and Part 8 of Schedule 22 to the Marine and Coastal Access Act 2009 (c. 23), paragraph 132 of Schedule 5, paragraph 16 of Schedule 7 and paragraph 100 of Part 4 of Schedule 14 to the Health and Social Care Act 2012 (c. 7), article 2 of S.I. 2008/3012, paragraph 429 of Part 1 of Schedule 2 to S.I. 2013/755, and article 4 of Part 1 of Schedule 3 to S.I. 2013/119.

(b) Parts 3 and 4 of Schedule 1 have been amended by paragraph 132 of Schedule 5 to the Health and Social Care Act 2012, paragraph 16 of Schedule 9 to the Civil Aviation Act 2012 (c.19), paragraph 81 of Part 5 of Schedule 12 to the Energy Act 2013 (c. 32), paragraph 152 of Part 2 of Schedule 1 to the Infrastructure Act 2015 (c. 7), article 2 of S.I. 2005/2043, paragraph 4 of Part 1 of Schedule 1 to S.I. 2005/3050, and paragraph 6 of Part 1 of Schedule 1 to S.I. 2016/645.

(c) 2006 c. 41. Section 14D was inserted by section 25 of the Health and Social Care Act 2012 (c. 7).

- (b) in relation to Wales, means a local health board established under section 11 of the National Health Service (Wales) Act 2006^(a), and
- (c) in relation to Scotland, a health board established under section 2 of the National Health Service (Scotland) Act 1978^(b);

“installation” means a unit in which the radioactive substances present are, or are intended to be, produced, used, handled or stored, and it includes—

- (a) equipment, structures, pipework, machinery and tools, and
- (b) jetties, warehouses or similar structures, whether floating or not, which are necessary for the operation of the unit;

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

“licensed site” means a site in respect of which a nuclear site licence has been granted and is in force;

“licensee” means a person to whom a nuclear site licence has been granted;

“local authority” means in relation to—

- (a) London, the London Fire Commissioner,
- (b) an area where there is a Metropolitan County Fire and Rescue Authority, that authority,
- (c) the Isles of Scilly, the Council of the Isles of Scilly,
- (d) an area in the rest of England, the county council for that area, or, where there is no county council for that area, the district council for that area,
- (e) an area in Scotland, the council for the local government area, and
- (f) an area in Wales, the county council or the county borough council for that area;

“medical surveillance” means medical surveillance carried out in accordance with the 2017 Regulations;

“non-dispersible source” means a sealed source or a radioactive substance which in either case by virtue of its physical and chemical form cannot cause a radiation emergency but it does not include any radioactive substance inside a nuclear reactor or any nuclear fuel element;

“nuclear site licence” has the meaning assigned to it by section 1(1) of the Nuclear Installations Act 1965^(c);

“off-site emergency plan” is to be interpreted in accordance with regulation 11;

“operator” has the meaning set out in paragraph (2);

“operator’s emergency plan” are to be interpreted in accordance with regulation 10;

“outline planning zone” means a zone determined in accordance with regulation 9 and covered by the local authority’s off-site emergency plan;

“premises” means—

- (a) the whole of an area under the control of an operator where radioactive substances are present in one or more installations, and for this purpose two or more areas under the control of the operator and separated only by a road, railway or inland waterway shall be treated as one whole area, or
- (b) where radioactive substances are present on a licensed site, that licensed site, and
- (c) where a radioactive substance forms an integral part of a vessel and is used in connection with the operation of that vessel, it includes that vessel when it is at fixed point moorings or alongside berths, save that such vessel is to be deemed separate premises only where

(a) 2006 c. 42.

(b) 1978 c. 29.

(c) 1965 c. 57. Section 1 was substituted by paragraph 17 of Part 2 of Schedule 12 to the Energy Act 2013.

such moorings or berths do not form part of a licensed site or part of premises under the control of the Secretary of State for Defence;

“radiation emergency” means a non-routine situation or event arising from work with ionising radiation that necessitates prompt action to mitigate the serious consequences—

- (a) of a hazard resulting from that situation or event;
- (b) of a perceived risk arising from such a hazard; or
- (c) to any one or more of—
 - (i) human life;
 - (ii) health and safety;
 - (iii) quality of life;
 - (iv) property;
 - (v) the environment;

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

“reference level” has the meaning given in regulation 20;

“regulator” means—

- (a) the Health and Safety Executive; or
- (b) the Office for Nuclear Regulation in the event the premises are—
 - (i) licensed sites;
 - (ii) authorised defence sites (within the meaning of regulation 2(1) of the Health and Safety (Enforcing Authority) Regulations 1998(a);
 - (iii) nuclear new build sites (within the meaning of regulation 2A of those Regulations(b)); or
 - (iv) nuclear warship sites (within the meaning given in regulation 2B of those Regulations(c)); but
- (c) in the event that an agreement has been reached between the Health and Safety Executive and the Office for Nuclear Regulation to transfer responsibility in respect of specific premises, the person to whom that responsibility was transferred;

“sealed source” means a source containing any radioactive substance whose structure is such as to prevent, under normal conditions of use, any dispersion of radioactive substances into the environment;

“work with ionising radiation” means work involving the production, processing, handling, use, holding, storage or disposal of radioactive substances which can increase the exposure of persons to radiation from an artificial source, or from a radioactive substance containing naturally occurring radionuclides which are processed for their radioactive, fissile or fertile properties.

(2) In these Regulations, any reference to an operator is a reference to—

- (a) in relation to any premises other than a licensed site, the person who is, in the course of a trade or business or other undertaking carried on by that person, in control of the operation of premises, and
- (b) in relation to a licensed site, the licensee,

and any duty imposed by these Regulations on the operator extends only in relation to those premises.

(3) In these Regulations—

(a) S.I. 1998/494. The reference to authorised defence sites was inserted by paragraph 72 of Schedule 3 to S.I. 2014/469.
(b) Regulation 2A was inserted by paragraph 73 of Schedule 3 to S.I. 2014/469.
(c) Regulation 2B was inserted by paragraph 73 of Schedule 3 to S.I. 2014/469.

- (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.
- (4) 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 its employee extends to a self-employed person in respect of that self-employed person,
 - (b) exposure to ionising radiation is a reference to exposure to ionising radiation arising from work with ionising radiation.

Application

3.—(1) Subject to paragraph (5) and with the exception of regulation 22, these Regulations apply to any work with ionising radiation which involves having on any premises a radioactive substance containing more than the quantity of any radionuclide specified in Schedule 1 or, in the case of fissile material, more than the mass of that material specified in Schedule 2.

(2) However, these Regulations do not apply to work falling within paragraph (1) where the operator can demonstrate that the quantity present on the premises would not allow, in an emergency situation, an annual effective dose of greater than 1 mSv.

(3) Where a radionuclide is not specified in Schedule 1—

- (a) an operator must carry out an assessment to determine whether the quantity present on the premises allows an annual effective dose greater than 1 mSv; and
- (b) if that assessment demonstrates that an annual effective dose greater than 1 mSv is allowable, then these Regulations apply.

(4) For the purposes of paragraph (1), a quantity specified in Schedule 1 is to 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 Part 1 of Schedule 1; or
- (b) where more than one radionuclide is involved, the quantity ratio calculated in accordance with Part 2 of Schedule 1 exceeds one.

(5) These Regulations do not apply in respect of—

- (a) any non-dispersible source;
- (b) any radioactive substance which has an activity concentration of not more than 100Bqg⁻¹;
- (c) any radioactive substance conforming to the specifications for special form radioactive material set out in sub-section 2.7.2.3.3. of the UN Model Recommendations on the Transport of Dangerous Goods: Model Regulations, as revised or reissued from time to time.

(6) These Regulations do not apply in Northern Ireland.

Hazard evaluation

4.—(1) The operator of any premises to which these Regulations apply must make a written evaluation before any work with ionising radiation is carried out for the first time at those premises.

(2) The evaluation required under paragraph (1) must be sufficient to identify all hazards arising from the work undertaken which have the potential to cause a radiation emergency.

(3) Where the evaluation required under paragraph (1) does not reveal any hazards having the potential to cause a radiation emergency, reasons for such a conclusion should be set out in that evaluation.

(4) Where the evaluation required under paragraph (1) does reveal the potential for a radiation emergency to occur, the operator must take all reasonably practicable steps to—

- (a) prevent the occurrence of an emergency; and
- (b) limit the consequences of any emergency which does occur.

(5) The requirements of this regulation are without prejudice to the requirements of regulation 3 (risk assessment) of the Management of Health and Safety at Work Regulations 1999(a) and to regulation 8 of the 2017 Regulations.

(6) The operator must provide the regulator with details of the evaluation made under paragraph (1) within 28 days of the date on which it is made.

Consequence assessment

5.—(1) Where the evaluation undertaken under regulation 4 reveals the potential for a radiation emergency to occur, the operator must make an assessment, in accordance with Schedule 3, to consider and evaluate a full range of possible consequences of the identified radiation emergencies, both on the premises and outside the premises, including the geographical extent of those consequences and any variable factors which have the potential to affect the severity of those consequences.

(2) The assessment required by this regulation must be completed within two months after the hazard evaluation required by regulation 4.

Review of hazard evaluation and consequence assessment

6.—(1) Where the operator proposes a change, or where a material change occurs, in the work with ionising radiation to which an operator was required to make an evaluation pursuant to regulation 4(1), the operator must make a further assessment to take account of that change.

(2) For such time as the work with ionising radiation in respect of an evaluation made pursuant to regulation 4(1) continues, the operator must, within 3 years of the date of the last evaluation (whether made in accordance with regulation 4, paragraph (1) or this paragraph) either—

- (a) make a further evaluation; or
- (b) if there is no change of circumstances which would affect the last consequences report required by regulation 7, make a declaration to that effect.

(3) Where a declaration is made in accordance with paragraph (2)(b), a copy of that declaration must be provided to the local authority and to the regulator within 28 days of the making of the declaration.

(4) The further evaluation required by this regulation must comply with the provisions of regulation 4(2) to (4), and regulation 5, where applicable.

Consequences report

7.—(1) Where the operator has made an assessment pursuant to regulation 5(1), the operator must prepare a report setting out the consequences identified by that assessment, called a consequences report, as soon as reasonably practicable on completion of the assessment.

(2) The operator must set out in the consequences report any minimum area from the premises which the operator considers should be covered by the local authority's off-site emergency plan.

(3) The operator must send the consequences report to the local authority in which the premises which are subject to the assessment are situated ("the lead local authority"), and to the regulator, before the start of any of the work with ionising radiation to which the assessment relates.

(a) S.I. 1999/3242. Regulation 3 was amended by S.I. 2005/1541/ 2015/21 and 2015/1637.

(4) Where an assessment has been made pursuant to regulation 5(1), the operator must send a consequences report to the local authority and to the regulator as soon as reasonably practicable after—

- (a) in the case of a proposal to make a change, the preparation of the assessment under regulation 6(1); or
- (b) a material change taking place; and
- (c) the making of a further evaluation in accordance with regulation 6(2)(a).

(5) A report made under this regulation must include the particulars set out in Schedule 4.

(6) Following receipt of the consequences report by the local authority, the operator must, within a reasonable period of time, offer a meeting to the local authority to discuss the consequences report.

(7) The operator must comply with any reasonable request for information made by a local authority, following receipt of the consequences report, to enable that local authority to prepare the off-site emergency plan which it is required to prepare under regulation 11, within 28 days of that information being requested.

Detailed emergency planning zone

8.—(1) The local authority must determine the detailed emergency planning zone, either on the basis of the operator's proposal under regulation 7(2), or having extended that area in consideration of local geographic, demographic and practical implementation issues.

(2) The issues referred to at paragraph (1) are—

- (a) the need to avoid bisecting local communities; and
- (b) the inclusion of vulnerable groups immediately adjacent to the area proposed by the operator.

(3) However, the local authority and operator may agree that, in relation to the premises, other arrangements are in place which sufficiently mitigate the consequences of any radiation emergency, and that no detailed emergency planning zone is necessary.

(4) The local authority must inform the operator and the regulator, within two months of having been sent the consequences report under regulation 7, of the determination made under paragraph (1).

(5) Where the local authority and the operator have agreed that no detailed emergency planning zone is necessary in accordance with paragraph (3), the local authority must inform the regulator as soon as reasonably practicable.

(6) On receipt of the local authority's confirmation of the detailed emergency planning zone, the operator must record the detailed emergency planning zone as finalised.

(7) The local authority may re-determine the detailed emergency planning zone—

- (a) if there is a material change in the local area which necessitates such a change; or
- (b) if the local authority deems it appropriate as a consequence of the operator's consequences report made after an evaluation in accordance with regulation 6(2)(a).

(8) If the local authority re-determines the detailed emergency planning zone in accordance with (4), it must inform the operator and regulator as soon as reasonably practicable.

Outline planning zone

9.—(1) The outline planning zone must be determined as follows—

- (a) in relation to a site for which the Office for Nuclear Regulation is the regulator, except for—
 - (i) an authorised defence site,
 - (ii) a nuclear warship site, or

(iii) a site which is a licensed site where that license has been granted to the Secretary of State [for Defence],

in accordance with Schedule 5.

(b) in relation to a site for which the Health and Safety Executive is the regulator, by the local authority following discussion with the operator;

(c) in relation to any other site, including the sites listed at sub-paragraph (a)(i) to (iii), by the Secretary of State following discussion with the local authority.

(2) The regulator and the Secretary of State may agree, in relation to a site falling within paragraph (1)(a), that the site has an outline planning zone which is greater or smaller than that determined in accordance with Schedule 5.

(3) The operator and the local authority may agree in relation to a site falling within paragraph (1)(b), that the site has no outline planning zone.

(4) The planning to be undertaken by the local authority in relation to the outline planning zone must be commensurate to the risk of a radiation emergency affecting that area, and the local authority's off-site emergency plan required under regulation 11 must clearly set out when that plan would be brought into effect in relation to the outline planning zone.

Operator's emergency plan

10.—(1) Where the operator has made an evaluation in accordance with regulation 4(1) which shows that a radiation emergency might arise, the operator must make an adequate emergency plan designed to secure, so far as is reasonably practicable, the restriction of exposure to ionising radiation and the health and safety of persons who may be affected by radiation emergencies identified by the evaluation.

(2) The operator must prepare the emergency plan required by this regulation within six months from the date of determination of the detailed emergency planning zone by the local authority in accordance with regulation 8.

(3) When preparing an emergency plan, as required by paragraph (1), the operator must take into account—

(a) the steps the operator has taken under regulation 4(4);

(b) any variable factors which might affect the severity of the emergency.

(4) The operator's emergency plan must—

(a) contain the information set out in Part 1 of Schedule 6; and

(b) be drawn up in accordance with the principles and purposes set out in Schedule 7.

(5) The operator must not require any person to carry out work with ionising radiation, and no person shall carry out such work unless—

(a) the operator has complied with the requirements of paragraph (1); and

(b) the local authority has complied with its duties in connection with the off-site emergency plan as set out in regulation 11, and has confirmed this to the operator in writing.

(6) The operator must, when preparing the emergency plan, or reviewing it under regulation 12(1), consult—

(a) the operator's employees;

(b) any persons carrying out work on behalf of the operator and who the operator considers might be affected by a radiation emergency;

(c) the local authority in whose area the premises to which the emergency plan relates is situated;

(d) the health authority in whose area the premises to which the emergency plan relates is situated;

(e) if the premises to which the emergency plan relates is in—

- (i) England, Public Health England, an executive agency of the Department of Health and Social Care known by that name,
 - (ii) Wales, Public Health Wales, and
 - (iii) Scotland, Health Protection Scotland; and
- (f) such other persons, bodies or authorities as the operator considers appropriate.

(7) In a case in which Category 1 responders form part of the emergency plan, the operator must give such information to those responders as will enable them to perform the functions which are allocated to them by the plan.

(8) The operator must ensure that any employee who may be involved with or may be affected by arrangements in the operator's emergency plan is or has been provided with—

- (a) suitable and sufficient information, instruction and training; and
- (b) any equipment necessary to restrict that employee's exposure to ionising radiation including, where appropriate, the issue of suitable dosimeters or other devices.

(9) An operator which has prepared an on-site emergency plan in accordance with this regulation must—

- (a) review that plan as a consequence of any review required by regulation 6; and
- (b) update the plan, if necessary, as a consequence of a review undertaken in accordance with sub-paragraph (a).

(10) The operator must retain the emergency plan on the premises to which it relates, and must provide a copy to the local authority and the regulator upon request and within such reasonable time as the local authority or the regulator may request.

Local authority's off-site emergency plan

11.—(1) Where premises require an emergency planning zone under either or both of regulations 8 or 9, the local authority must make an adequate off-site emergency plan covering that zone or zones.

(2) The plan required by paragraph (1) must be designed to mitigate, so far as is reasonably practicable, the consequences of a radiation emergency outside the operator's premises.

(3) The off-site emergency plan must—

- (a) contain the information set out in Chapter 1 of Part 2 of Schedule 6 about the detailed emergency planning zone (if appropriate);
- (b) contain the information set out at Chapter 2 of Part 2 of Schedule 6 about the outline planning zone (if appropriate);
- (c) comply with Part 3 of Schedule 6; and
- (d) be drawn up in accordance with the principles and purposes set out in Schedule 7.

(4) The off-site emergency plan must be prepared within 6 months and in any event before the operator commences work with ionising radiation to which the evaluation made in accordance with regulation 4(1) applies.

(5) In preparing an off-site emergency plan, pursuant to paragraph (1) or in reviewing such a plan pursuant to regulation 12(1), the local authority must consult—

- (a) the operator of the premises to which the plan relates;
- (b) Category 1 responders;
- (c) Category 2 responders (where appropriate);
- (d) each health authority in the vicinity of the premises to which the plan relates (if that health authority is not a Category 1 responder);
- (e) the Agency;
- (f) if the premises to which the emergency plan relates is in—

- (i) England, Public Health England, an executive agency of the Department of Health and Social Care known by that name,
 - (ii) Wales, Public Health Wales, and
 - (iii) Scotland, Health Protection Scotland; and
 - (g) such other persons, bodies or authorities as the operator considers appropriate.
- (6) Following preparation of the off-site emergency plan, the local authority must confirm in writing to the operator that it has prepared such a plan as soon as reasonably practicable.
- (7) The local authority must provide a copy of the off-site emergency plan, or parts of it, to the regulator upon request and within such reasonable time as the regulator may specify.

Reviewing and testing of emergency plans

12.—(1) Each operator or local authority who has prepared an emergency plan pursuant to regulation 10 or 11, as the case may be, must, at suitable intervals not exceeding 3 years unless otherwise agreed by the regulator—

- (a) review and where necessary revise the plan for which they are responsible; and
- (b) test that plan, taking reasonable steps to arrange for all those with a role in the relevant emergency plan to participate in the test to such an extent necessary to ensure that the plan is effective.

(2) The test required by paragraph (1)(b) need not extend to testing a local authority's emergency plan so far as it extends to the outline planning zone, unless—

- (a) a test is necessary in order to review or revise the plan, as required under paragraph (1)(a); or
- (b) the regulator requires a test.

(3) The regulator may only agree that the review and test required under paragraph (1) may take place after the expiry of a three year period if—

- (a) the operator or local authority, as the case may be, has sent a written request for such an extension of time to the regulator; and
- (b) the written request is sufficient to demonstrate that the circumstances of the request are exceptional.

(4) A review required under paragraph (1) must take into account—

- (a) changes occurring in the work with ionising radiation to which the plan relates;
- (b) changes within the emergency services concerned;
- (c) new knowledge or guidance, whether technical or otherwise, concerning the response to radiation emergencies;
- (d) any material change to the assessment on which the plan was based since it was last reviewed or revised; and
- (e) any relevant information derived from an assessment of or a report about the consequences of an emergency plan required by regulation 17(4)(b) or (c).

(5) The operator must cooperate with a local authority which is subject to a duty to prepare an emergency plan and Category 1 responders as to how the off-site emergency plan is to be tested.

(6) A review or test of the plan required by this regulation must take into account any lessons learned from—

- (a) past emergency exposure situations, whether at the operator's premises or not; and
- (b) the United Kingdom's participating in emergency exercises at national and international level.

(7) The test of the plan, required by paragraph (1)(b) must be adequate to test the ability to implement the plan in question, but the operator or the local authority, as the case may be, must consider the extent of the testing required bearing in mind—

- (a) the length of time since the last test;
- (b) the extent of the testing undertaken on the last occasion;
- (c) any use of the plan as a response to a radiation emergency since the last test; and
- (d) any revisions made by the review required under paragraph (1)(a).

(8) After completion of the test required by paragraph (1)(b), each operator or local authority, as the case may be, must prepare a report on the outcome of the test within three months of the conclusion of the test.

(9) A report made under paragraph (8) must be sent to the regulator within 28 days of its preparation.

(10) Where a report made under paragraph (8) was made by the operator, the operator must send it to the local authority within 28 days of its preparation, and where such a report was made by the local authority, the local authority must send it to the operator within 28 days of its preparation.

Co-operation: operator and local authority

13. The operator and the local authority must cooperate in respect of their duties to prepare emergency plans to ensure that—

- (a) the operator's emergency plan and the local authority's off-site emergency plan operate effectively both independently and in conjunction;
- (b) communication between the operator and the local authority is expedited during any radiation emergency.

Co-operation between local authorities

14.—(1) A local authority may request, in writing, the co-operation of another local authority in order to—

- (a) make its off-site emergency plan;
- (b) test its off-site emergency plan as required under regulation 12(1)(b).

(2) Where a local authority has made a written request of another local authority under paragraph (1), the local authority which has received such a request must, as soon as reasonably practicable, co-operate in assisting the requesting local authority in both making and testing its off-site emergency plan.

Consultation and co-operation: employers

15.—(1) In performing the duties imposed on an operator under regulations 4(1), 5(1), 6(1), 6(2) and 10, that operator must consult any other employer who carries out work with ionising radiation on the premises and take into account relevant matters arising from that consultation.

(2) Any employer who carries out work with ionising radiation at premises to which these Regulations apply must cooperate with the operator of those premises or the local authority in whose jurisdiction the premises is by providing information or otherwise to the extent necessary to ensure that the operator or local authority, as the case may be, is able to comply with the operator and the local authority's duty to prepare an emergency plan.

(3) Any employer of any other person whose participation is reasonably required by any emergency plan required under these Regulations must co-operate with the operator or the local authority, as the case may be, in the exchange of information or otherwise to the extent necessary to ensure that the operator or the local authority is enabled to comply with the requirements of these Regulations, insofar as the operator or the local authority's ability to comply depends on such co-operation.

(4) The co-operation required by an employer or other person under paragraphs (2) and (3) extends to co-operation in the testing of emergency plans where such co-operation is necessary to secure compliance with regulation 12.

Charge for preparation, review and testing of emergency plans

16.—(1) A local authority may charge an operator a fee for the performance of the local authority's functions in relation to the off-site emergency plan under regulations 11 and 12.

(2) The fee charged under paragraph (1) must not exceed the sum of the costs reasonably incurred by the local authority in performing its functions referred to in that paragraph including any costs reasonably incurred in arranging for any participants to participate in the testing of the off-site emergency plan.

(3) When requiring payment of its costs, the local authority must provide the operator with a detailed statement of the costs incurred, and the period to which the statement relates.

(4) The local authority's fee under this regulation is payable one month after the statement required under paragraph (3) has been provided, unless, within that period, the operator informs the local authority that it considers that its costs are unreasonable and requests additional information from the local authority concerning its costs.

(5) Additional information requested under paragraph (4) must be provided by the local authority within 28 days of receipt of the request, and the period for payment of the fee provided under that paragraph is extended for a further period of two months.

(6) A fee charged under this regulation is recoverable as a civil debt.

Implementation of emergency plans

17.—(1) An operator who has prepared an emergency plan pursuant to regulation 10 must take reasonable steps to put it, or such parts of it as are necessary, into effect without delay—

- (a) when a radiation emergency occurs; or
- (b) if an event occurs which might lead to a radiation emergency.

(2) When an operator takes the steps set out in (1), the operator must at the same time inform the local authority in whose area the premises is situated and the regulator that the operator has put its plan into effect.

(3) A local authority which has prepared an off-site emergency plan pursuant to regulation 11 must take reasonable steps to ensure that it, or such parts of it as are necessary, are put into effect without delay—

- (a) when informed by the operator that a radiation emergency has occurred; or
- (b) that an event has occurred which could give rise to a radiation emergency.

(4) In the event of a radiation emergency occurring, or on the occurrence of an event which could give rise to a radiation emergency, the operator, with the local authority where the local authority has prepared an off-site emergency plan, must—

- (a) as soon as reasonably practicable make a provisional assessment of the circumstances and consequences of such an emergency, and for this purpose must consult—
 - (i) the emergency services;
 - (ii) the health authority in whose area the premises to which the emergency plan relates is situated;
 - (iii) the health bodies set out at regulation 10(6)(e) and 11(5)(e) respectively;
 - (iv) the Agency; and
 - (v) any other persons, bodies or authorities which have functions under the operator's emergency plan, or the off-site emergency plan.
- (b) as soon as is reasonably practicable and in any event within 12 months, or such longer time as the regulator may agree, make a full assessment of the consequences of the emergency and the effectiveness of the emergency plans put into effect as a result of the emergency; and

- (c) within 28 days of the completion of the assessment made under sub-paragraph (b), the operator must make a report of the findings of the assessment and retain that report or a copy of that report for at least 50 years from the date on which the report was completed.

(5) The operator must provide the regulator with a copy of the report made under paragraph (4)(c) within 28 days of it having been made.

Emergency exposures: employees

18.—(1) Where an emergency plan prepared pursuant to these Regulations provides for the possibility of any employee receiving an emergency exposure, each employer must, in relation to that employer's employees—

- (a) identify those employees who may be subject to emergency exposures;
- (b) provide those employees with appropriate training in the field of radiation protection and such information and instruction as is suitable and sufficient for them to know the risks to health created by exposure to ionising radiation and the precautions which should be taken;
- (c) provide such equipment as is necessary to restrict the exposure of such employees to radiation;
- (d) make arrangements for medical surveillance by an appointed doctor or employment medical advisor to be carried out without delay in the event of a radiation emergency in respect of those employees who receive emergency exposures;
- (e) make arrangements with an approved dosimetry service for—
 - (i) dose assessments to be carried out without delay in the event of a radiation emergency in respect of those employees who receive emergency exposures, and a dose assessment made for the purpose of this sub-paragraph shall, where practicable, be made separately from any other dose assessment relating to those employees; and
 - (ii) the results of the dose assessments carried out under sub-paragraph (i) above to be notified without delay to the employer and to the regulator;
- (f) make arrangements, in respect of dose assessments to be carried out and notified pursuant to sub-paragraph (e) above, to notify the results of such assessments without delay to the appointed doctor or employment medical adviser who is carrying out the medical surveillance on the employee to whom the assessment relates; and
- (g) identify those employees who are authorised, in the event of a radiation emergency, to permit any employee referred to in sub-paragraph (a) above to be subject to an emergency exposure and provide employees who are so authorised with appropriate training.

(2) An operator must, before the first occasion of commencing work with ionising radiation to which these Regulations apply, notify the regulator of the dose levels which the operator has determined are appropriate to be applied in respect of an employee identified for the purposes of paragraph (1)(a) in the event of an emergency.

(3) Where an operator determines that a dose level notified under paragraph (2) is no longer appropriate to be applied in respect of an employee identified for the purposes of paragraph (1)(a) in the event of such emergency, and that a revised level should be determined, the operator must, at least 28 days before formally determining the revised dose level, or within such shorter time as the regulator agrees, notify the regulator of the revised dose level which the operator considers is appropriate to be applied.

(4) In any case where, in the opinion of the regulator, the dose levels for emergency exposure notified pursuant to paragraph (2) or (3) are too high, the operator must, if directed to do so by the regulator, substitute such other dose level or levels as the regulator considers appropriate.

(5) Where an emergency plan is put into effect pursuant to regulation 17, each employer must ensure—

- (a) that no employee of that employer who is under 18 years of age, no trainee or apprentice under the age of 18 years of age, and no female employee who is pregnant or breastfeeding is subject to an emergency exposure;
- (b) that no other employee of that employer is subject to an emergency exposure unless—
 - (i) that employee has agreed to undergo such exposure;
 - (ii) the requirements of paragraph (1)(a) to (f) have been complied with in respect of that employee; and
 - (iii) that employee has been permitted to be so by an employee authorised for that purpose under paragraph (1)(g); and
- (c) that no employee of that employer involved in implementing an emergency plan is exposed to a dose of radiation in excess of the dose level determined in accordance with paragraphs (2), (3) or (4).

(6) The requirement imposed on the employer by paragraph (5)(a) in respect of a female employee who is pregnant or breastfeeding does not apply until that employee has notified the employer in writing of that fact or the employer ought reasonably to have been aware of that fact.

(7) The requirement imposed by paragraph (5)(c) does not apply in respect of an exposure of any employee who—

- (a) being informed about the risks involved in the implementation of an emergency plan, agrees to undergo an exposure greater than any dose level referred to in that subparagraph for the purpose of saving human life; and
- (b) is permitted to undergo such exposure by an employee authorised by the employer in accordance with paragraph (1)(g) to give such permission.

(8) Where an employee has undergone an emergency exposure, the employer must ensure that the dose of ionising radiation received by that employee is assessed by an approved dosimetry service and that the dose assessed is recorded separately in the dose record of that employee or, where no dose record exists, in a record created for the purpose of this paragraph complying with the requirements to which it would be subject if it were a dose record.

(9) An employer must, at the request of that employer's employee in circumstances where a dose record has been created for the purpose of paragraph (8) and on reasonable notice being given, obtain from the approved dosimetry service and make available to the employee a copy of the record of dose relating to that employee.

(10) In the event of a report being made pursuant to regulation 16(4) relating to the circumstances of an emergency exposure and the action taken as a result of that exposure, an employer shall keep such a report (or copy of the report) until the person to whom the report relates has or would have attained the age of 75 years but in any event for at least 30 years from the termination of the work which involved any emergency exposure.

(11) An employer who has a duty under this regulation must also comply with that duty as regards any person who regularly provides a service to that employer as a volunteer.

Disapplication of dose limits

19.—(1) Regulation 12 of the 2017 Regulations does not apply to an emergency worker, where that emergency worker—

- (a) is engaged in preventing the occurrence of a radiation emergency;
- (b) is acting to mitigate the consequences of a radiation emergency.

(2) An emergency worker may be exposed to an effective dose not exceeding 500 mSv whilst they are undertaking the activities set out in paragraph (1).

Reference levels

20.—(1) The operator or local authority which has prepared an emergency plan in accordance with regulation 10 or 11, as the case may be, must ensure that that plan prioritises keeping doses

below a 100mSv reference level of the site or emergency specific reference level if applicable and set in the range of 20 to 100 mSv effective dose (acute or annual) for emergency exposure situations.

(2) Where the response to a radiation emergency is underway, specific reference levels, to optimise the response, may be determined by the local authority in whose area an off-site emergency plan is in place.

(3) In determining a specific reference level under paragraph (2), the local authority must take advice from the person coordinating the response to the radiation emergency.

(4) The Secretary of State may also set a reference level whether applicable locally or nationally in addition to any reference level set under paragraph (2).

Prior information to the public

21.—(1) The local authority which has responsibility for an area covered by an off-site emergency plan must, in cooperation with the operator, ensure that members of the public have access to the relevant information set out in Schedule 8.

(2) The relevant information referred to in paragraph (1) is—

- (a) where the area is covered by a detailed emergency planning zone only, the information set out in Part 1 of Schedule 8 only;
- (b) where the area is covered by an outline planning zone and a detailed emergency planning zone, the information set out in paragraph 8 of Schedule 8 in addition to the information set out in Part 1 of Schedule 8;
- (c) where the area is covered by an outline planning zone only, the information set out in Part 2 of Schedule 8.

(3) The information to which members of the public have access must be made available to them both electronically and in hard copy.

(4) In preparing the information to be supplied in accordance with paragraph (1), the local authority must consult such persons who seems to that local authority to be appropriate.

(5) The local authority must review, and where necessary revise, the relevant information referred to in paragraph (2)—

- (a) at regular intervals, but in any case not less than once in every three years; and
- (b) whenever significant changes to the emergency measures, action and authorities referred to in paragraphs 3, 4 and 5 of Schedule 8 take place.

(6) Where the information has been revised in accordance with paragraph (5) the local authority must ensure that the revised information is made available to members of the public who had access to the information.

(7) The operator must ensure that the information referred to in paragraph (2) is supplied in accordance with that paragraph before it carries out the work with ionising radiation to which the evaluation made in accordance with regulation 4(1) applies.

(8) The local authority must ensure that the information is supplied again and made publicly available—

- (a) at intervals not exceeding three years; and
- (b) if it is revised pursuant to paragraph (5), as soon as reasonably practicable after the revision.

(9) Where a report is made pursuant to regulation 7, the local authority must make that report available to the public as soon as reasonably practicable after it has been sent to the regulator under that regulation (except that, with the approval of the regulator, the local authority must not make available any part or parts of such report for reasons of industrial, commercial or personal confidentiality, public security or national security).

Duty of local authority to supply information to the public in the event of an emergency

22.—(1) Every local authority must prepare and keep up to date arrangements to supply, in the event of an emergency in that local authority’s area (however that emergency may arise), information about and advice on the facts of the emergency, of the steps to be taken and, as appropriate, of health protection measures applicable.

(2) The arrangements prepared and kept up to date under paragraph (1) must provide for the information to be supplied at regular intervals in an appropriate manner, without delay, and without their having to request it, to members of the public who are in that local authority’s area and who are actually affected by the emergency.

(3) In preparing those arrangements and in keeping them up to date, the local authority must consult any other authority likely to be responsible for implementing the relevant measures referred to in Schedule 9 and such other persons as appear to it to be appropriate.

(4) The information and advice to be supplied in accordance with arrangements prepared and kept up to date under paragraph (1) must, if relevant to the type of emergency, include that specified in Schedule 9 and must, in any event, mention the authority or authorities responsible for implementing the relevant measures referred to in that Schedule.

(5) For the purposes of paragraph (2), the members of the public referred to in that paragraph as actually affected are those whose cooperation is sought to put into effect any steps or health protection measures referred to in paragraph (1).

(6) In this regulation, “emergency” includes a radiation emergency, but also includes any other emergency (whether within the United Kingdom or otherwise) which does or could impact on ionising radiation in the United Kingdom.

Retention of information

23. Each operator and each local authority which has duties by virtue of these Regulations must retain the information they are required to prepare, in particular under regulations 4 to 12 and 17, and must produce that information if requested to do so by the regulator or the Secretary of State.

Modifications relating to the Ministry of Defence etc

24.—(1) In this regulation, any reference to

- (a) “visiting forces” is a reference to visiting forces within the meaning of any provision of Part 1 of the Visiting Forces Act 1952(a); 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(b).

(2) The Secretary of State for Defence 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 in 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 for Defence,

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

(a) 1952 c. 67.

(b) 1964 c. 5.

(3) The requirements of regulation 18 do not have effect in relation to Her Majesty's Forces to the extent that compliance with those requirements would, in the opinion of the Secretary of State for Defence, be against the interests of national security.

Disclosure of information

25. Where any person is entitled to seek any information from an operator under these Regulations, the Secretary of State may certify in writing that, in the opinion of the Secretary of State, the provision of that information would be contrary to the interests of national security.

Revocation

26. The Radiation (Emergency Preparedness and Public Information) Regulations 2001(a) are revoked.

Transitional and savings provisions

27.—(1) Any person who had a duty under the Radiation (Emergency Preparedness and Public Information) Regulations 2001 ("the 2001 Regulations") prior to these Regulations coming into force shall continue to comply with the provisions of the 2001 Regulations, notwithstanding the revocation made in regulation 28, until ***.

(2) A person who had a duty under the 2017 Regulations, but not the 2001 Regulations, prior to these Regulations coming into force is not subject to a duty under these Regulations until ***.

(3) After ***, these Regulations must be complied with in full, save that any test of an emergency plan carried out in the three years prior to *** shall be treated as though it were a test undertaken pursuant to regulation 15.

Consequential amendments

28. Placeholder.

Review

29.—(1) The Secretary of State must from time to time—

- (a) carry out a review of the regulatory provisions contained in these Regulations, and
- (b) publish a report setting out the conclusions of the review.

(2) The first report must be published before [*aligns to 5 years after the cif of these Regs].

(3) Subsequent reports must be published at intervals not exceeding 5 years.

(4) Section 30(3) of the Small Business, Enterprise and Employment Act 2015(b) requires that a review carried out under this regulation must, so far as is reasonable, have regard to how the obligations under [cite articles after transposition table done] of [the Directive] are implemented in other member States.

(5) Section 30(4) of the Small Business, Enterprise and Employment Act 2015 requires that a report published under this regulation must, in particular—

- (a) set out the objectives intended to be achieved by the regulatory provision referred to in paragraph (1)(a),
- (b) assess the extent to which those objectives are achieved,
- (c) assess whether those objectives remain appropriate, and
- (d) if those objectives remain appropriate, assess the extent to which they could be achieved in another way which involves less onerous regulatory provision.

(a) S.I. 2001/2975.

(b) 2015 c. 26. Section 30(3) was amended by section 19 of the the Enterprise Act 2016 (c. 12).

(6) In this regulation, “regulatory provision” has the same meaning as in sections 28 to 32 of the Small Business, Enterprise and Employment Act 2015 (see section 32 of that Act).

Date

Secretary of State

SCHEDULE 1

Regulation 3(1)

PART 1

Table of radionuclides

<i>Radionuclide</i>	<i>Form</i>	<i>Activity (Bq)</i>
Actinium		
Ac-224		2×10^{11}
Ac-225		3×10^{09}
Ac-226		2×10^{10}
Ac-227		5×10^{07}
Ac-228		7×10^{11}
Aluminium		
Al-26		6×10^{11}
Americium		
Am-237		2×10^{14}
Am-238		9×10^{13}
Am-239		3×10^{13}
Am-240		1×10^{13}
Am-241		3×10^{08}
Am-242		1×10^{12}
Am-242m		3×10^{08}
Am-243		3×10^{08}
Am-244		7×10^{12}
Am-244m		2×10^{14}
Am-245		1×10^{14}
Am-246		9×10^{13}
Am-246m		1×10^{14}
Antimony		
Sb-115		2×10^{14}
Sb-116		9×10^{13}
Sb-116m		4×10^{13}
Sb-117		3×10^{14}
Sb-118m		3×10^{13}
Sb-119		1×10^{14}
Sb-120		3×10^{14}
Sb-120m		7×10^{12}
Sb-122		5×10^{12}
Sb-124		2×10^{12}
Sb-124n		1×10^{15}
Sb-125		2×10^{12}
Sb-126		3×10^{12}
Sb-126m		1×10^{14}
Sb-127		4×10^{12}
Sb-128		1×10^{13}
Sb-128m		1×10^{14}

Sb-129	2×10^{13}
Sb-130	4×10^{13}
Sb-131	5×10^{13}
Argon	
Ar-37	2×10^{20}
Ar-39	4×10^{16}
Ar-41	7×10^{13}
Arsenic	
As-69	1×10^{14}
As-70	3×10^{13}
As-71	2×10^{13}
As-72	5×10^{12}
As-73	2×10^{13}
As-74	5×10^{12}
As-76	5×10^{12}
As-77	2×10^{13}
As-78	3×10^{13}
Astatine	
At-207	1×10^{13}
At-211	2×10^{11}
Barium	
Ba-126	3×10^{13}
Ba-128	4×10^{12}
Ba-131	1×10^{13}
Ba-131m	1×10^{15}
Ba-133	2×10^{12}
Ba-133m	1×10^{13}
Ba-135m	2×10^{13}
Ba-139	7×10^{13}
Ba-140	3×10^{12}
Ba-141	1×10^{14}
Ba-142	2×10^{14}
Berkelium	
Bk-245	9×10^{12}
Bk-246	2×10^{13}
Bk-247	4×10^{08}
Bk-249	2×10^{11}
Bk-250	2×10^{13}
Beryllium	
Be-7	2×10^{14}
Be-10	8×10^{11}
Bismuth	
Bi-200	6×10^{13}
Bi-201	4×10^{13}
Bi-202	4×10^{13}
Bi-203	2×10^{13}
Bi-205	8×10^{12}
Bi-206	4×10^{12}
Bi-207	2×10^{12}
Bi-210	3×10^{11}
Bi-210m	8×10^{09}
Bi-212	1×10^{12}
Bi-213	1×10^{12}
Bi-214	3×10^{12}
Bromine	

Br-74		3×10^{13}
Br-74m		3×10^{13}
Br-75		6×10^{13}
Br-76		1×10^{13}
Br-77		8×10^{13}
Br-80		3×10^{14}
Br-80m		7×10^{13}
Br-82		1×10^{13}
Br-83		1×10^{14}
Br-84		6×10^{13}
Cadmium		
Cd-104		2×10^{14}
Cd-107		1×10^{14}
Cd-109		2×10^{12}
Cd-113		2×10^{11}
Cd-113m		2×10^{11}
Cd-115		6×10^{12}
Cd-115m		2×10^{12}
Cd-117		3×10^{13}
Cd-117m		2×10^{13}
Caesium		
Cs-125		1×10^{14}
Cs-127		2×10^{14}
Cs-129		1×10^{14}
Cs-130		2×10^{14}
Cs-131		2×10^{14}
Cs-132		2×10^{13}
Cs-134		4×10^{11}
Cs-134m		2×10^{14}
Cs-135		3×10^{12}
Cs-135m		1×10^{14}
Cs-136		5×10^{12}
Cs-137		4×10^{11}
Cs-138		5×10^{13}
Calcium		
Ca-41		6×10^{13}
Ca-45		2×10^{12}
Ca-47		2×10^{12}
Californium		
Cf-244		3×10^{12}
Cf-246		6×10^{10}
Cf-248		3×10^{09}
Cf-249		4×10^{08}
Cf-250		9×10^{08}
Cf-251		4×10^{08}
Cf-252		1×10^{09}
Cf-253		2×10^{10}
Cf-254		5×10^{08}
Carbon		
C-11		2×10^{14}
	carbon dioxide	2×10^{14}
	carbon monoxide	3×10^{14}
	methane	3×10^{14}
	vapour	2×10^{14}
C-14		5×10^{12}

carbon dioxide	3×10^{12}
carbon monoxide	3×10^{12}
methane	3×10^{12}
vapour	3×10^{12}
Cerium	
Ce-134	3×10^{12}
Ce-135	1×10^{13}
Ce-137	3×10^{14}
Ce-137m	1×10^{13}
Ce-139	9×10^{12}
Ce-141	5×10^{12}
Ce-143	7×10^{12}
Ce-144	4×10^{11}
Chlorine	
Cl-36	3×10^{12}
Cl-38	5×10^{13}
Cl-39	6×10^{13}
Chromium	
Cr-48	4×10^{13}
Cr-49	9×10^{13}
Cr-51	2×10^{14}
Cobalt	
Co-55	9×10^{12}
Co-56	1×10^{12}
Co-57	1×10^{13}
Co-58	5×10^{12}
Co-58m	4×10^{14}
Co-60	6×10^{11}
Co-60m	5×10^{15}
Co-61	1×10^{14}
Co-62m	7×10^{13}
Copper	
Cu-60	4×10^{13}
Cu-61	5×10^{13}
Cu-64	6×10^{13}
Cu-67	2×10^{13}
Curium	
Cm-238	6×10^{12}
Cm-240	8×10^{09}
Cm-241	7×10^{11}
Cm-242	5×10^{09}
Cm-243	4×10^{08}
Cm-244	5×10^{08}
Cm-245	3×10^{08}
Cm-246	3×10^{08}
Cm-247	3×10^{08}
Cm-248	8×10^{07}
Cm-249	2×10^{14}
Cm-250	1×10^{07}
Dysprosium	
Dy-155	6×10^{13}
Dy-157	1×10^{14}
Dy-159	4×10^{13}
Dy-165	7×10^{13}
Dy-166	5×10^{12}

Einsteinium	
Es-250m	4×10^{13}
Es-251	1×10^{13}
Es-253	1×10^{10}
Es-254	3×10^{09}
Es-254m	6×10^{10}
Erbium	
Er-161	7×10^{13}
Er-165	5×10^{14}
Er-169	1×10^{13}
Er-171	2×10^{13}
Er-172	8×10^{12}
Europium	
Eu-145	1×10^{13}
Eu-146	7×10^{12}
Eu-147	1×10^{13}
Eu-148	3×10^{12}
Eu-149	4×10^{13}
Eu-150	5×10^{11}
Eu-150m	2×10^{13}
Eu-152	6×10^{11}
Eu-152m	2×10^{13}
Eu-154	5×10^{11}
Eu-155	4×10^{12}
Eu-156	3×10^{12}
Eu-157	1×10^{13}
Eu-158	6×10^{13}
Fermium	
Fm-252	9×10^{10}
Fm-253	7×10^{10}
Fm-254	4×10^{11}
Fm-255	1×10^{11}
Fm-257	3×10^{09}
Fluorine	
F-18	8×10^{13}
Francium	
Fr-222	3×10^{12}
Fr-223	4×10^{12}
Gadolinium	
Gd-145	7×10^{13}
Gd-146	3×10^{12}
Gd-147	1×10^{13}
Gd-148	1×10^{09}
Gd-149	1×10^{13}
Gd-151	1×10^{13}
Gd-152	2×10^{09}
Gd-153	7×10^{12}
Gd-159	2×10^{13}
Gallium	
Ga-65	1×10^{14}
Ga-66	7×10^{12}
Ga-67	4×10^{13}
Ga-68	6×10^{13}
Ga-70	3×10^{14}
Ga-72	8×10^{12}

Ga-73		3×10^{13}
Germanium		
Ge-66		7×10^{13}
Ge-67		9×10^{13}
Ge-68		2×10^{12}
Ge-69		3×10^{13}
Ge-71		6×10^{14}
Ge-75		2×10^{14}
Ge-77		2×10^{13}
Ge-78		7×10^{13}
Gold		
Au-193		6×10^{13}
Au-194		2×10^{13}
Au-195		1×10^{13}
Au-198		7×10^{12}
Au-198m		6×10^{12}
Au-199		2×10^{13}
Au-200		1×10^{14}
Au-200m		8×10^{12}
Au-201		3×10^{14}
Hafnium		
Hf-170		2×10^{13}
Hf-172		7×10^{11}
Hf-173		4×10^{13}
Hf-175		1×10^{13}
Hf-177m		5×10^{13}
Hf-178m		1×10^{11}
Hf-179m		4×10^{12}
Hf-180m		4×10^{13}
Hf-181		4×10^{12}
Hf-182		1×10^{11}
Hf-182m		1×10^{14}
Hf-183		8×10^{13}
Hf-184		2×10^{13}
Holmium		
Ho-155		1×10^{14}
Ho-157		4×10^{14}
Ho-159		4×10^{14}
Ho-161		6×10^{14}
Ho-162		1×10^{15}
Ho-162m		2×10^{14}
Ho-164		7×10^{14}
Ho-164m		5×10^{14}
Ho-166		6×10^{12}
Ho-166m		2×10^{11}
Ho-167		7×10^{13}
Hydrogen		
H-3		1×10^{14}
	organically bound tritium	3×10^{14}
	elemental gas	7×10^{14}
	tritiated methane	2×10^{15}
	tritiated water vapour	7×10^{14}
Indium		
In-109		9×10^{13}
In-110		3×10^{13}

In-110m		5×10^{13}
In-111		3×10^{13}
In-112		5×10^{14}
In-113m		2×10^{14}
In-114		4×10^{15}
In-114m		9×10^{11}
In-115		7×10^{10}
In-115m		8×10^{13}
In-116m		5×10^{13}
In-117		1×10^{14}
In-117m		7×10^{13}
In-119m		2×10^{14}
Iodine		
I-120		2×10^{13}
	methyl iodide	2×10^{13}
	elemental	1×10^{13}
I-120m		2×10^{13}
	methyl iodide	2×10^{13}
	elemental	2×10^{13}
I-121		9×10^{13}
	methyl iodide	9×10^{13}
	elemental	8×10^{13}
I-123		3×10^{13}
	methyl iodide	3×10^{13}
	elemental	3×10^{13}
I-124		6×10^{11}
	methyl iodide	5×10^{11}
	elemental	4×10^{11}
I-125		1×10^{12}
	methyl iodide	1×10^{12}
	elemental	8×10^{11}
I-126		3×10^{11}
	methyl iodide	3×10^{11}
	elemental	2×10^{11}
I-128		2×10^{14}
	methyl iodide	2×10^{14}
	elemental	2×10^{14}
I-129		2×10^{11}
	methyl iodide	2×10^{11}
	elemental	1×10^{11}
I-130		3×10^{12}
	methyl iodide	3×10^{12}
	elemental	3×10^{12}
I-131		3×10^{11}
	methyl iodide	2×10^{11}
	elemental	2×10^{11}
I-132		4×10^{13}
	methyl iodide	3×10^{13}
	elemental	3×10^{13}
I-132m		3×10^{13}
	methyl iodide	3×10^{13}
	elemental	2×10^{13}
I-133		4×10^{12}
	methyl iodide	3×10^{12}
	elemental	2×10^{12}

I-134		4×10^{13}
	methyl iodide	4×10^{13}
	elemental	4×10^{13}
I-135		2×10^{13}
	methyl iodide	1×10^{13}
	elemental	1×10^{13}
Iridium		
Ir-182		1×10^{14}
Ir-184		3×10^{13}
Ir-185		3×10^{13}
Ir-186		2×10^{13}
Ir-186m		7×10^{13}
Ir-187		6×10^{13}
Ir-188		1×10^{13}
Ir-189		2×10^{13}
Ir-190		5×10^{12}
Ir-190m		1×10^{15}
Ir-190n		8×10^{13}
Ir-192		3×10^{12}
Ir-192n		8×10^{11}
Ir-193m		2×10^{13}
Ir-194		6×10^{12}
Ir-194m		1×10^{12}
Ir-195		7×10^{13}
Ir-195m		3×10^{13}
Iron		
Fe-52		7×10^{12}
Fe-55		2×10^{13}
Fe-59		3×10^{12}
Fe-60		8×10^{10}
Krypton		
Kr-74		2×10^{14}
Kr-76		2×10^{14}
Kr-77		1×10^{14}
Kr-79		4×10^{14}
Kr-81		3×10^{16}
Kr-81m		7×10^{16}
Kr-83m		3×10^{18}
Kr-85		2×10^{16}
Kr-85m		6×10^{14}
Kr-87		1×10^{14}
Kr-88		5×10^{13}
Lanthanum		
La-131		1×10^{14}
La-132		2×10^{13}
La-135		3×10^{14}
La-137		3×10^{12}
La-138		2×10^{11}
La-140		1×10^{13}
La-141		2×10^{13}
La-142		3×10^{13}
La-143		2×10^{14}
Lead		
Pb-195m		1×10^{14}
Pb-198		8×10^{13}

Pb-199		9×10^{13}
Pb-200		2×10^{13}
Pb-201		5×10^{13}
Pb-202		2×10^{12}
Pb-202m		4×10^{13}
Pb-203		3×10^{13}
Pb-205		3×10^{13}
Pb-209		1×10^{14}
Pb-210		5×10^{09}
Pb-211		2×10^{12}
Pb-212		1×10^{11}
Pb-214		3×10^{12}
Lutetium		
Lu-169		2×10^{13}
Lu-170		9×10^{12}
Lu-171		1×10^{13}
Lu-172		6×10^{12}
Lu-173		7×10^{12}
Lu-174		5×10^{12}
Lu-174m		5×10^{12}
Lu-176		4×10^{11}
Lu-176m		5×10^{13}
Lu-177		1×10^{13}
Lu-177m		1×10^{12}
Lu-178		2×10^{14}
Lu-178m		1×10^{14}
Lu-179		4×10^{13}
Magnesium		
Mg-28		4×10^{12}
Manganese		
Mn-51		7×10^{13}
Mn-52		5×10^{12}
Mn-52m		6×10^{13}
Mn-53		2×10^{14}
Mn-54		4×10^{12}
Mn-56		3×10^{13}
Mendelevium		
Md-257		1×10^{12}
Md-258		4×10^{09}
Mercury		
Hg-193	inorganic	6×10^{13}
	organic	8×10^{13}
	vapour	2×10^{13}
Hg-193m	inorganic	2×10^{13}
	organic	3×10^{13}
	vapour	7×10^{12}
Hg-194	inorganic	2×10^{12}
	organic	9×10^{11}
	vapour	7×10^{11}
Hg-195	inorganic	8×10^{13}
	organic	1×10^{14}
	vapour	2×10^{13}
Hg-195m	inorganic	1×10^{13}
	organic	2×10^{13}
	vapour	3×10^{12}

Hg-197	inorganic	3×10^{13}
	organic	5×10^{13}
	vapour	6×10^{12}
Hg-197m	inorganic	1×10^{13}
	organic	2×10^{13}
	vapour	4×10^{12}
Hg-199m	inorganic	2×10^{14}
	organic	2×10^{14}
	vapour	1×10^{14}
Hg-203	inorganic	8×10^{12}
	organic	8×10^{12}
	vapour	3×10^{12}
Molybdenum		
Mo-90		2×10^{13}
Mo-93		6×10^{12}
Mo-93m		3×10^{13}
Mo-99		1×10^{13}
Mo-101		1×10^{14}
Neodymium		
Nd-136		9×10^{13}
Nd-138		1×10^{13}
Nd-139		2×10^{14}
Nd-139m		3×10^{13}
Nd-141		8×10^{14}
Nd-147		6×10^{12}
Nd-149		6×10^{13}
Nd-151		2×10^{14}
Neon		
Ne-19		1×10^{16}
Neptunium		
Np-232		2×10^{14}
Np-233		2×10^{15}
Np-234		1×10^{13}
Np-235		3×10^{13}
Np-236		4×10^{09}
Np-236m		3×10^{12}
Np-237		6×10^{08}
Np-238		6×10^{12}
Np-239		9×10^{12}
Np-240		6×10^{13}
Nickel		
Ni-56		9×10^{12}
	nickel carbonyl	9×10^{12}
Ni-57		1×10^{13}
	nickel carbonyl	1×10^{13}
Ni-59		6×10^{13}
	nickel carbonyl	3×10^{13}
Ni-63		2×10^{13}
	nickel carbonyl	1×10^{13}
Ni-65		4×10^{13}
	nickel carbonyl	3×10^{13}
Ni-66		3×10^{12}
	nickel carbonyl	3×10^{12}
Nitrogen		
N-13	gas	4×10^{14}

Niobium		
Nb-88		5×10^{13}
Nb-89		2×10^{13}
Nb-89m		5×10^{13}
Nb-90		7×10^{12}
Nb-93m		1×10^{13}
Nb-94		5×10^{11}
Nb-95		9×10^{12}
Nb-95m		1×10^{13}
Nb-96		8×10^{12}
Nb-97		9×10^{13}
Nb-98m		4×10^{13}
Osmium		
Os-180		5×10^{14}
Os-181		6×10^{13}
Os-182		2×10^{13}
Os-185		7×10^{12}
Os-189m		4×10^{14}
Os-191		9×10^{12}
Os-191m		7×10^{13}
Os-193		1×10^{13}
Os-194		3×10^{11}
Oxygen		
O-15	gas	2×10^{15}
Palladium		
Pd-100		1×10^{13}
Pd-101		8×10^{13}
Pd-103		3×10^{13}
Pd-107		5×10^{13}
Pd-109		1×10^{13}
Phosphorus		
P-32		7×10^{11}
P-33		4×10^{12}
Platinum		
Pt-186		8×10^{13}
Pt-188		1×10^{13}
Pt-189		7×10^{13}
Pt-191		3×10^{13}
Pt-193		2×10^{14}
Pt-193m		2×10^{13}
Pt-195m		1×10^{13}
Pt-197		2×10^{13}
Pt-197m		1×10^{14}
Pt-199		2×10^{14}
Pt-200		8×10^{12}
Plutonium		
Pu-234		1×10^{12}
Pu-235		2×10^{15}
Pu-236		8×10^{08}
Pu-237		4×10^{13}
Pu-238		3×10^{08}
Pu-239		3×10^{08}
Pu-240		3×10^{08}
Pu-241		1×10^{10}
Pu-242		3×10^{08}

Pu-243	8×10^{13}
Pu-244	3×10^{08}
Pu-245	1×10^{13}
Pu-246	2×10^{12}
Polonium	
Po-203	8×10^{13}
Po-205	7×10^{13}
Po-206	1×10^{11}
Po-207	5×10^{13}
Po-208	3×10^{09}
Po-209	2×10^{09}
Po-210	4×10^{09}
Potassium	
K-40	1×10^{12}
K-42	2×10^{13}
K-43	3×10^{13}
K-44	5×10^{13}
K-45	8×10^{13}
Praseodymium	
Pr-136	1×10^{14}
Pr-137	1×10^{14}
Pr-138m	4×10^{13}
Pr-139	2×10^{14}
Pr-142	6×10^{12}
Pr-142m	6×10^{14}
Pr-143	5×10^{12}
Pr-144	2×10^{14}
Pr-145	2×10^{13}
Pr-147	2×10^{14}
Promethium	
Pm-141	2×10^{14}
Pm-143	9×10^{12}
Pm-144	2×10^{12}
Pm-145	8×10^{12}
Pm-146	1×10^{12}
Pm-147	5×10^{12}
Pm-148	3×10^{12}
Pm-148m	2×10^{12}
Pm-149	8×10^{12}
Pm-150	3×10^{13}
Pm-151	1×10^{13}
Protactinium	
Pa-227	4×10^{11}
Pa-228	4×10^{11}
Pa-230	4×10^{10}
Pa-231	2×10^{08}
Pa-232	3×10^{12}
Pa-233	5×10^{12}
Pa-234	1×10^{13}
Radium	
Ra-223	3×10^{09}
Ra-224	8×10^{09}
Ra-225	4×10^{09}
Ra-226	3×10^{09}
Ra-227	6×10^{13}

Ra-228		2×10^{09}
Rhenium		
Re-177		5×10^{14}
Re-178		1×10^{14}
Re-181		2×10^{13}
Re-182		5×10^{12}
Re-182m		3×10^{13}
Re-184		6×10^{12}
Re-184m		3×10^{12}
Re-186		5×10^{12}
Re-186m		2×10^{12}
Re-187		1×10^{15}
Re-188		6×10^{12}
Re-188m		3×10^{14}
Re-189		1×10^{13}
Rhodium		
Rh-99		1×10^{13}
Rh-99m		9×10^{13}
Rh-100		1×10^{13}
Rh-101		4×10^{12}
Rh-101m		4×10^{13}
Rh-102		2×10^{12}
Rh-102m		9×10^{11}
Rh-103m		2×10^{15}
Rh-105		2×10^{13}
Rh-106m		3×10^{13}
Rh-107		3×10^{14}
Rubidium		
Rb-79		9×10^{13}
Rb-81		9×10^{13}
Rb-81m		8×10^{14}
Rb-82m		3×10^{13}
Rb-83		6×10^{12}
Rb-84		4×10^{12}
Rb-86		3×10^{12}
Rb-87		6×10^{12}
Rb-88		9×10^{13}
Rb-89		8×10^{13}
Ruthenium		
Ru-94		9×10^{13}
	ruthenium tetroxide	8×10^{13}
Ru-97		6×10^{13}
	ruthenium tetroxide	6×10^{13}
Ru-103		7×10^{12}
	ruthenium tetroxide	1×10^{13}
Ru-105		3×10^{13}
	ruthenium tetroxide	3×10^{13}
Ru-106		4×10^{11}
	ruthenium tetroxide	8×10^{11}
Samarium		
Sm-141		1×10^{14}
Sm-141m		7×10^{13}
Sm-142		5×10^{13}
Sm-145		1×10^{13}
Sm-146		3×10^{09}

Sm-147		3×10^{09}
Sm-151		7×10^{12}
Sm-153		1×10^{13}
Sm-155		3×10^{14}
Sm-156		3×10^{13}
Scandium		
Sc-43		4×10^{13}
Sc-44		2×10^{13}
Sc-44m		4×10^{12}
Sc-46		2×10^{12}
Sc-47		1×10^{13}
Sc-48		5×10^{12}
Sc-49		1×10^{14}
Selenium		
Se-70		6×10^{13}
Se-73		3×10^{13}
Se-73m		2×10^{14}
Se-75		4×10^{12}
Se-79		2×10^{12}
Se-81		3×10^{14}
Se-81m		1×10^{14}
Se-83		6×10^{13}
Silicon		
Si-31		6×10^{13}
Si-32		3×10^{11}
Silver		
Ag-102		7×10^{13}
Ag-103		1×10^{14}
Ag-104		5×10^{13}
Ag-104m		7×10^{13}
Ag-105		1×10^{13}
Ag-106		2×10^{14}
Ag-106m		6×10^{12}
Ag-108m		6×10^{11}
Ag-110m		1×10^{12}
Ag-111		6×10^{12}
Ag-112		2×10^{13}
Ag-115		1×10^{14}
Sodium		
Na-22		1×10^{12}
Na-24		1×10^{13}
Strontium		
Sr-80		3×10^{13}
Sr-81		8×10^{13}
Sr-82		1×10^{12}
Sr-83		2×10^{13}
Sr-85		1×10^{13}
Sr-85m		6×10^{14}
Sr-87m		2×10^{14}
Sr-89		2×10^{12}
Sr-90		2×10^{11}
Sr-91		1×10^{13}
Sr-92		2×10^{13}
Sulphur		
S-35	inorganic	1×10^{13}

	organic	1×10^{13}
	gas / vapour	1×10^{11}
Tantalum		
Ta-172		7×10^{13}
Ta-173		4×10^{13}
Ta-174		8×10^{13}
Ta-175		4×10^{13}
Ta-176		2×10^{13}
Ta-177		7×10^{13}
Ta-178m		7×10^{13}
Ta-179		3×10^{13}
Ta-180		1×10^{14}
Ta-182		2×10^{12}
Ta-182m		4×10^{14}
Ta-183		5×10^{12}
Ta-184		1×10^{13}
Ta-185		1×10^{14}
Ta-186		1×10^{14}
Technetium		
Tc-93		7×10^{13}
Tc-93m		1×10^{14}
Tc-94		3×10^{13}
Tc-94m		5×10^{13}
Tc-95		4×10^{13}
Tc-95m		8×10^{12}
Tc-96		8×10^{12}
Tc-96m		7×10^{14}
Tc-97		2×10^{13}
Tc-97m		6×10^{12}
Tc-98		5×10^{11}
Tc-99		2×10^{12}
Tc-99m		3×10^{14}
Tc-101		3×10^{14}
Tc-104		6×10^{13}
Tellurium		
Te-116		5×10^{13}
	vapour	6×10^{13}
Te-121		2×10^{13}
	vapour	2×10^{13}
Te-121m		3×10^{12}
	vapour	2×10^{12}
Te-123		4×10^{12}
	vapour	2×10^{12}
Te-123m		4×10^{12}
	vapour	3×10^{12}
Te-125m		5×10^{12}
	vapour	6×10^{12}
Te-127		4×10^{13}
	vapour	5×10^{13}
Te-127m		2×10^{12}
	vapour	2×10^{12}
Te-129		1×10^{14}
	vapour	1×10^{14}
Te-129m		2×10^{12}
	vapour	2×10^{12}

Te-131		9×10^{13}
	vapour	8×10^{13}
Te-131m		4×10^{12}
	vapour	3×10^{12}
Te-132		4×10^{12}
	vapour	2×10^{12}
Te-133		8×10^{13}
	vapour	8×10^{13}
Te-133m		2×10^{13}
	vapour	2×10^{13}
Te-134		6×10^{13}
	vapour	6×10^{13}
Terbium		
Tb-147		3×10^{13}
Tb-149		5×10^{12}
Tb-150		2×10^{13}
Tb-151		2×10^{13}
Tb-153		1×10^{13}
Tb-154		1×10^{13}
Tb-155		4×10^{13}
Tb-156		7×10^{12}
Tb-156m		5×10^{13}
Tb-156n		9×10^{13}
Tb-157		2×10^{13}
Tb-158		6×10^{11}
Tb-160		2×10^{12}
Tb-161		9×10^{12}
Thallium		
Tl-194		2×10^{14}
Tl-194m		7×10^{13}
Tl-195		1×10^{14}
Tl-197		2×10^{14}
Tl-198		5×10^{13}
Tl-198m		7×10^{13}
Tl-199		2×10^{14}
Tl-200		3×10^{13}
Tl-201		9×10^{13}
Tl-202		2×10^{13}
Tl-204		6×10^{12}
Thorium		
Th-226		6×10^{11}
Th-227		3×10^{09}
Th-228		7×10^{08}
Th-229		1×10^{08}
Th-230		3×10^{08}
Th-231		2×10^{13}
Th-232		3×10^{08}
Th-234		2×10^{12}
Thulium		
Tm-162		9×10^{13}
Tm-166		2×10^{13}
Tm-167		1×10^{13}
Tm-170		2×10^{12}
Tm-171		2×10^{13}
Tm-172		5×10^{12}

Tm-173	3×10^{13}
Tm-175	2×10^{14}
Tin	
Sn-110	3×10^{13}
Sn-111	2×10^{14}
Sn-113	6×10^{12}
Sn-117m	7×10^{12}
Sn-119m	9×10^{12}
Sn-121	3×10^{13}
Sn-121m	5×10^{12}
Sn-123	2×10^{12}
Sn-123m	2×10^{14}
Sn-125	2×10^{12}
Sn-126	8×10^{11}
Sn-127	3×10^{13}
Sn-128	5×10^{13}
Titanium	
Ti-44	2×10^{11}
Ti-45	4×10^{13}
Tungsten	
W-176	1×10^{14}
W-177	9×10^{13}
W-178	5×10^{13}
W-179	2×10^{15}
W-181	9×10^{13}
W-185	2×10^{13}
W-187	1×10^{13}
W-188	4×10^{12}
Uranium	
U-230	2×10^{09}
U-231	2×10^{13}
U-232	8×10^{08}
U-233	3×10^{09}
U-234	3×10^{09}
U-235	3×10^{09}
U-236	3×10^{09}
U-237	8×10^{12}
U-238	4×10^{09}
U-239	3×10^{14}
U-240	8×10^{12}
Vanadium	
V-47	9×10^{13}
V-48	3×10^{12}
V-49	3×10^{14}
Xenon	
Xe-120	3×10^{14}
Xe-121	7×10^{13}
Xe-122	2×10^{15}
Xe-123	2×10^{14}
Xe-125	4×10^{14}
Xe-127	4×10^{14}
Xe-129m	4×10^{15}
Xe-131m	1×10^{16}
Xe-133	3×10^{15}
Xe-133m	3×10^{15}

Xe-135	4×10^{14}
Xe-135m	4×10^{14}
Xe-138	1×10^{14}
Ytterbium	
Yb-162	3×10^{14}
Yb-166	1×10^{13}
Yb-167	6×10^{14}
Yb-169	6×10^{12}
Yb-175	2×10^{13}
Yb-177	8×10^{13}
Yb-178	7×10^{13}
Yttrium	
Y-86	9×10^{12}
Y-86m	2×10^{14}
Y-87	2×10^{13}
Y-88	2×10^{12}
Y-90	3×10^{12}
Y-90m	4×10^{13}
Y-91	2×10^{12}
Y-91m	3×10^{14}
Y-92	2×10^{13}
Y-93	7×10^{12}
Y-94	9×10^{13}
Y-95	1×10^{14}
Zinc	
Zn-62	9×10^{12}
Zn-63	7×10^{13}
Zn-65	3×10^{12}
Zn-69	2×10^{14}
Zn-69m	2×10^{13}
Zn-71m	3×10^{13}
Zn-72	6×10^{12}
Zirconium	
Zr-86	1×10^{13}
Zr-88	6×10^{12}
Zr-89	1×10^{13}
Zr-93	1×10^{12}
Zr-95	3×10^{12}
Zr-97	4×10^{12}

PART 2

Quantity ratios for more than one radionuclide

1. For the purpose of regulation 3(2), 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 column of Part 1 of this Schedule Q_{lim} , namely—

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

2. In any case where the isotopic composition of a radioactive substance is not known or is only partially known, the quantity ratio for that substance is to be calculated by using the values specified in the appropriate column in Part 1 for “other radionuclides not listed above” for any

radionuclide that has not been identified or where the quantity 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 2

Regulation 3(1)

For the purpose of regulation 3(1), the specified mass of a fissile material are—

- (a) plutonium as Pu-239 or Pu-241 or as a mixture of plutonium isotopes containing Pu-239 or Pu 241 – 150 grams;
- (b) uranium as U233 – 150 grams;
- (c) uranium enriched in U-235 to more than 1% but not more than 5% - 500 grams; and
- (d) uranium enriched in U-235 to more than 5% - 250 grams.

SCHEDULE 3

Regulation 5(2)

1. The following requirements must be complied with in the assessment of consequences required by regulation 5.

2. The assessment must be based on a suitable and sufficient range of source terms representing the range of potential radiation emergencies which might arise from the work with ionising radiation.

3. The calculations undertaken in order to reach the assessment must consider a range of weather conditions (if weather conditions are capable of affecting the extent of the radiation emergency) indicating—

- (a) the likely consequences of such conditions; and
- (b) consequences which are less likely, but with greater impact.

4. The assessment must consider the consequences of the radiation emergency situations identified in regulation 4 on the population as a whole, providing details for different characteristics, including, for example age and other characteristics which would render specific members of the public especially vulnerable.

5. The assessment must consider what would be an effective and equivalent dose in the context of each radiation emergency identified.

6. The assessment must include all relevant pathways by which members of the public could be exposed to radiation in the context of each radiation emergency identified.

7. The assessment must assess the consequences of suitable and sufficient source terms by distance and by exposure pathway, and the distances to which emergency countermeasures would be required based on the United Kingdom Emergency Reference Levels, published by Public Health England^(a).

8. The assessment must identify any urgent protective actions that may need to be taken for the range of potential radiation emergencies.

9. In this Schedule “source term” means the radioactivity which is or could be released to the environment in a radiation emergency and includes—

- (a) the amount of each radionuclide released;
- (b) the time distribution of the release;
- (c) the energy associated with atmospheric release; and

(a) [Footnote for location of PHE ERLs]

- (d) the likely chemical and physical form of the radionuclides in the release.

SCHEDULE 4

Regulation 7(5)

Particulars to be included in a consequences report

PART 1

Factual Information

1. The following factual information must be provided in the operator's consequences report—
- (a) the name and address of the operator;
 - (b) the postal address of the premises where the radioactive substance will be processed, manufactured, used or stored, or where the facilities for processing, manufacture, use or storage exist;
 - (c) the date on which it is anticipated that the work with ionising radiation will commence or, if it has already commenced, a statement to that effect;
 - (d) the factors which could precipitate a major release of any radioactive substance and the measures to be taken to prevent or control such release; and
 - (e) the factors which could precipitate a small but continuing release of any radioactive substance and the measures to be taken to prevent or control such releases.

PART 2

Recommendations

2. The operator must include the following recommendations in the consequences report—
- (a) the proposed detailed emergency planning zone, if any; and
 - (b) the minimum distances to which urgent protective actions may need to be taken, marking against each distance the timescale for implementation of the relevant protective measures.
3. Where it is the operator's responsibility to determine, the consequences report must set out that outline planning zone.
4. Where a detailed planning zone is recommended under paragraph 2, the operator must also include within the consequences report—
- (a) the recommended urgent protective actions to be taken within that zone, if any, together with timescales for the implementation of those actions;
 - (b) details of the environmental pathways at risk, including any food and water restrictions; and
 - (c) when and to whom information is to be handed over in order to effect a transition from a radiation emergency.

PART 3

Rationale

5. The operator must set out the rationale supporting each recommendation made in the consequences report.
6. In particular, the operator must set out—

- (a) the rationale for its recommendation on the minimum distances for which urgent preventative action may need to be taken;
- (b) its rationale for setting the outline planning zone under paragraph 3; and
- (c) where the operator and local authority have agreed that no off-site planning is required, and therefore no emergency planning zone is recommended, the rationale for that agreement.

SCHEDULE 5

Regulation 9

The following table applies for the purpose of setting the outline planning zone in accordance with regulation 9(1)(a).

<i>Nature of site</i>	<i>Outline planning zone</i>
Sites involved in the processing of High Level Waste and/ or storing in excess of 100 tonnes of Plutonium	50 kilometres
Operating nuclear power plants and decommissioning nuclear power plants with a presence of irradiated fuels	30 kilometres
Sites with a significant presence of enriched uranium and decommissioning nuclear sites (other than power plants) with a significant presence of irradiated fuels	5 kilometres
Decommissioned sites without a significant presence of irradiated fuels	1 kilometre
Sites involved in the production of radiopharmaceuticals	No outline planning zone

SCHEDULE 6

Regulations 10(4) and 11(3)

Information to be included in Emergency Plans

PART 1

Information to be included in an Operator's Emergency Plan

1. The information referred to in regulation 10(4) is as follows—
 - (a) the names or positions of persons authorised to set emergency procedures in motion;
 - (b) the name or position of the person in charge of and co-ordinating the on-site mitigatory action;
 - (c) the name or position of the person with responsibility for liaison with the local authority responsible for preparing the off-site emergency plan;
 - (d) for conditions or events which could be significant in bringing about a radiation emergency, a description of the action which should be taken to control the conditions or events and to limit their consequences, including a description of the safety equipment and resources available;

- (e) the arrangements for limiting the risks to persons on the premises including how warnings are to be given and the actions persons are expected to take on receipt of a warning;
- (f) the arrangements for providing early warning of the incident to the local authority responsible for setting the off-site emergency plan in motion, the type of information which should be contained in an initial warning and the arrangements for the provision of more detailed information as it becomes available;
- (g) the arrangements for providing assistance to the local authority with its off-site mitigatory action;
- (h) the arrangements for providing information about the incident to the Secretary of State and the regulator;
- (i) the arrangements for providing information about the incident to the Scottish Government or the Welsh Ministers, if appropriate;
- (j) the arrangements for emergency exposures including the dose levels which have been determined as appropriate for the purposes of putting into effect the emergency plan;
- (k) the arrangements to prioritise the dose consequences of between 20 and 100 mSv in accordance with regulation 20;
- (l) any specific arrangements which take account of lessons learned from past emergency situations, whether at the operator's premises or otherwise;
- (m) what protective action is proposed to be taken, and how far such each action extends within any detailed emergency planning zone; and
- (n) the arrangements which the operator considers may assist in the transition from a radiation emergency to an existing exposure situation, including who will be involved in such transition and what information they are to receive.

PART 2

Information to be included in the off-site emergency plan

CHAPTER 1

Information about detailed emergency planning zones

2. The information referred to in regulation 11(3)(a) is as follows—
- (a) the names or positions of persons authorised to set emergency procedures in motion;
 - (b) the names or positions of the person authorised to take charge of and co-ordinate the off-site mitigatory action;
 - (c) the arrangements for receiving early warning of incidents, and alert and call-out procedures;
 - (d) the arrangements for co-ordinating resources necessary to implement the off-site emergency plan;
 - (e) the arrangements for providing assistance to the operator with on-site mitigatory action;
 - (f) the arrangements for off-site mitigatory action;
 - (g) the arrangements for providing the public with specific information relating to the emergency and the response or responses recommended to the public as a whole or parts of it as a result of the emergency;
 - (h) the arrangements for emergency exposures including the dose levels which have been determined as appropriate for the purposes of putting into effect the emergency plan
 - (i) the arrangements to prioritise the dose consequences of between 20 and 100 mSv in accordance with regulation 20;
 - (j) the arrangements for carrying out an assessment of the impacts of the radiation; and

- (k) the arrangements which the local authority considers necessary in the transition from a radiation emergency to an existing exposure situation, including who will be involved in such a transition and what information they are to receive.

CHAPTER 2

Information about outline planning zones

- 3. The information referred to in regulation 11(3)(b) is as follows—
 - (a) where there is no detailed emergency planning zone, the information set out at paragraph 3; and
 - (b) in all cases—
 - (i) at what stage and how the response to an emergency triggers a response within the outline planning zone; and
 - (ii) whether there are any areas of detailed planning within the outline planning zone.
- 4. In paragraph 3(b)(ii), an area of detailed planning within the outline planning zone means an area within which a greater degree of planning is necessary as a result of the existence of particular factors such as schools or hospitals within that area.

CHAPTER 3

Information with which an off-site emergency plan must comply

- 5. In order to comply with regulation 11(3)(c) an off-site emergency plan must—
 - (a) set out the extent of the detailed emergency planning zone and the outline planning zone (if any);
 - (b) in respect of the detailed emergency planning zone, set out—
 - (i) the severity of the consequences in terms of dose quantity;
 - (ii) the probability of an emergency occurring; and
 - (iii) the existence or potential existence of any variable factors which might affect the severity of the consequences of an emergency
 - (iv) the extent to which the consequences can be mitigated by timely action;
 - (c) set out how the off-site emergency plan aims to mitigate the consequence of an emergency, in response to the factors listed at (b); and
 - (d) set out the process for determining when the site and the surrounding area is no longer in an emergency state.

SCHEDULE 7

Regulations 10(4) and 11(3)

Principles and purposes of emergency plans

PART 1

Principles to which emergency plans must have regard

- 1. The person with responsibility for preparing an emergency plan under these Regulations must consider the following principles when preparing that plan—
 - (a) the necessity for the plan to respond to the particular characteristics of a given radiation emergency as those characteristics emerge;
 - (b) the necessity to optimise protection strategies to ensure that the proposed response, as a whole, is predicted to do more to mitigate the radiation emergency and facilitate transition from that emergency than to increase its duration or consequence, taking into account—

- (i) the health risks arising from exposure to ionising radiation as a result of the radiation emergency, in both the long and the short term;
 - (ii) the economic consequences of the radiation emergency;
 - (iii) the effects of the disruption, both on the premises and the area immediately surrounding it, and on the public perception of the effects of the radiation emergency;
- (c) the necessity of avoiding, so far as possible, the occurrence of serious physical injury to any person or persons;
 - (d) the necessity of ensuring that an appropriate balance is struck between the expected harms and benefits of any particular protective measure so as to maximise the benefit of that measure.

PART 2

Purposes of emergency plans

- 2.** The person with responsibility for preparing an emergency plan under these Regulations must ensure that the plan fulfils the following purposes—
- (a) to reduce or stop the release of radiation;
 - (b) to reduce the exposure to individuals and to the environment resulting from the release of ionising radiation;
 - (c) if necessary, to ensure that provision is made for the medical treatment of those affected by the release of ionising radiation;
 - (d) to prioritise the implementation of the plan in relation to a person exposed to a dose consequence in excess of the reference level set out in regulation 20.

SCHEDULE 8

Regulation 21(1)

Prior information to be supplied and made publicly available

PART 1

Information in relation to detailed emergency planning zones

- 1.** Basic facts about radiation and its effects on persons and on the environment.
- 2.** The various types of radiation emergency identified and their consequences for the general public and the environment.
- 3.** Emergency measures envisaged to alert, protect and assist the general public in the event of a radiation emergency.
- 4.** Appropriate information on action to be taken by the general public in the event of a radiation emergency.
- 5.** The authority or authorities responsible for implementing the emergency measures and action referred to in paragraphs 3 and 4 above.
- 6.** The extent of the detailed emergency planning zone.

PART 2

Information in relation to outline planning zones

7. Where the information set out at paragraphs 1 to 5 can be obtained.
8. The extent of the outline planning zone.
 - (a) The factors which would cause the plan in respect of the outline planning zone to be triggered, and whether there are any areas of detailed planning within the outline planning zone as defined at paragraph 4 of Part 2 of Schedule 6.

SCHEDULE 9

Regulation 22(4)

Information to be supplied in the event of a radiation emergency

1. Information on the type of emergency which has occurred, and, where possible, its characteristics, for example, its origin, extent and probable development.
2. Advice on health protection measures which may include, depending on the type of emergency—
 - (a) any restrictions on the consumption of certain foodstuffs and water supply likely to be contaminated;
 - (b) any basic rules on hygiene and decontamination;
 - (c) any recommendation to stay indoors;
 - (d) the distribution and use of protective substances;
 - (e) any evacuation arrangements;
 - (f) special warnings for certain population groups.
3. Any announcements recommending cooperation with instructions or requests by the regulator.
4. Where an incident which is likely to give rise to a release of radioactivity or ionising radiation has taken place but no release has yet occurred, the information and advice should include the following—
 - (a) details of the relevant communications channels on which information about the incident will be available;
 - (b) preparatory advice to establishments with particular collective responsibilities; and
 - (c) recommendations to occupational groups particularly affected.
5. If time permits, information setting out the basic facts about radioactivity and its effects on persons and on the environment.

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations revoke and supersede the Radiation (Emergency Preparedness and Public Information) Regulations 2001.

The Regulations impose duties on operators of premises in which work with ionising radiation takes place to identify the hazards arising from the work with such radiation which have the potential to cause a radiation emergency. Where such hazards exist, the operator is under a duty to assess the consequences of the radiation emergency, and liaise with the local authority. Both the local authority and the operator must engage in planning against the radiation emergency occurring, test such plans at regular intervals and provide information to the public.

The Regulations implement in part as respects Great Britain provisions of Council Directive 2013/59/Euratom (OJ No L13, 17.1.2014, p 1) 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.

Regulation 3 makes provision for the application of the Regulations. The Regulations apply to work with ionising radiation on premises on which there is a radioactive substance containing more than the quantity of any radionuclide set out in Schedule 1, or, in the case of fissile material, more than the mass of the fissile material, as set out in Schedule 2. Where a radionuclide is not specified in Schedule 1, the operator must assess whether the quantity present on the premises would allow an annual dose of greater than 1 mSv, and, if so, these Regulations also apply.

Regulation 4 provides that the operator must, before work is carried out for the first time at the premises, carry out an evaluation of the hazards arising from the work undertaken on the premises to determine whether they have the potential to cause a radiation emergency. Where they have that potential, regulation 4 require operators to undertake preventative and mitigatory action.

Regulation 5 provides that, where an operator has identified the potential for a radiation emergency pursuant to its evaluation, the operator must make a further assessment in accordance with Schedule 3 to evaluate the full range of consequences of such a radiation emergency.

Regulation 6 provides that, where the operator proposes a change in its work with ionising radiation, or where a change occurs, the operator must undertake review of its evaluation in accordance with regulation 4 and either make a further assessment in accordance with regulation 5 or make a declaration that the change of circumstances which triggered the review would not affect the last evaluation.

Regulation 7 requires the operator to send a consequences report to the local authority, which includes a proposed detailed emergency planning zone, and must discuss those consequences with the local authority.

Regulation 8 provides that it is the responsibility of the local authority to determine the detailed emergency planning zone, either on the basis of the operator's proposal or, on the basis that the local authority's off-site emergency plan requires it, to extend the detailed emergency planning zone.

Regulation 9 provides for who will determine an outline planning zone in relation to certain sites.

Regulation 10 provides that the operator is responsible for preparing an emergency plan where the evaluation under regulation 4 shows that a radiation emergency may arise.

Regulation 11 provides that, where there is a detailed emergency planning zone, an outline planning zone, or both, the local authority must prepare an off-site emergency plan to mitigate the consequences of a radiation emergency outside the operator's premises.

Regulation 12 makes provision for the reviewing and testing of both the operator's on-site emergency plan and the local authority's off-site emergency plan.

Regulation 13 provides for cooperation between the operator and the local authority in fulfilling their duties to prepare emergency plans, and regulation 14 provides for cooperation between local authorities in the making and testing of off-site emergency plans. Regulation 15 provides for cooperation between operators and other employers on the same premises.

Regulation 16 provides that a local authority may charge the operator for performing its functions in relation to the preparation and testing of an off-site emergency plan.

Regulation 17 sets out when operators and local authorities should implement their emergency plans and who should be informed about that implementation.

Regulation 18 provides that training and equipment should be provided to employees by their employer where there is the possibility of that employee receiving an emergency exposure of

ionising radiation and makes further provision for employees where an emergency plan is put into place.

Regulation 19 disapplies regulation 12 of the Ionising Radiations Regulations 2017 to an emergency worker who is engaged in preventing or mitigating the consequences of a radiation emergency.

Regulation 20 provides that the operator's emergency plans and the local authority's off-site emergency plans must prioritise the mitigation of dose consequences between 20 and 100 mSv. When the response to a radiation emergency is underway, the specific reference levels may be determined by the local authority, who may seek advice from the person coordinating the response to that emergency,

Regulations 21 and 22 provide for information to be provided to the public in an area covered by a detailed emergency planning zone and in the event of an emergency respectively.

Regulation 23 provides for the retention of information by the operator and the local authority.

Regulation 24 provides for specific modifications of the Regulations for the purposes of the Ministry of Defence, relating to national security.

Regulation 25 provides that, where a person is entitled to seek information under the Regulations, the Secretary of State may certify that the provision of that information would be contrary to the interests of national security.

Regulation 26 provides for the revocation of the Radiation (Emergency Preparedness and Public Information) Regulations 2001, subject to the transitional and savings provisions set out in regulation 27.

Regulation 28 provides for consequential amendments.

Regulation 29 provides that the Secretary of State must review the Regulations on a regular basis.

A full impact assessment of the effect that this instrument will have on the costs of business, the voluntary sector and the public sector is available from the Department for Business, Energy and Industrial Strategy, 1 Victoria Street, London.