STATUTORY RULES OF NORTHERN IRELAND

2019 No. 185

HEALTH AND SAFETY

The Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019

Made - - - -	*26th September 2019*
Coming into operation	*1st November 2019*

The Department for the Economy(**1**), being the Department concerned(**2**), makes these Regulations in exercise of the powers conferred by Articles 17(1) to (5), 20(2), 40(2) and (4), 54(1) and 55(2) of, and paragraphs 12, 14, 15, 17 and 19 of Schedule 3 to, the Health and Safety at Work (Northern Ireland) Order 1978 ("the 1978 Order")(**3**).

The Regulations give effect without modifications to proposals submitted to the Department by the Health and Safety Executive for Northern Ireland under Article 13(1A)(**4**) of the 1978 Order after the Executive had carried out consultations in accordance with Article 46(3)(**5**).

It appears to the Department that—

a) the modifications referred to in paragraphs 1 to 4 and 6 of Schedule 9 are expedient as set out in Article 54(1) of the 1978 Order; and

b) it is not appropriate to consult bodies in respect of such modifications in accordance with Article 54(5) of that Order.

Citation and commencement

1. These Regulations may be cited as the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019 and come into operation on 1st November 2019.

Interpretation

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

(**1**) Formerly the Department of Enterprise, Trade and Investment; *see*2016 c. 5, section 1(3); that Department was formerly the Department of Economic Development; *see*S.I. 1999/283 (N.I. 1), Article 3(5); that Department was formerly the Department of Manpower Services, *see*S.I. 1982/846 (N.I. 11), Article 3

(**2**) See Article 2(2) of S.I. 1978/1039 (N.I. 9)

(**3**) S.I. 1978/1039 (N.I. 9): the general purposes of Part II referred to in Article 17(1) were extended by S.I. 1992/1728 (N.I. 17), Articles 3(1) and 4(1). Article 55(2) was amended by S.I. 1998/2795 (N.I. 18), Article 6(1) and Schedule 1, paragraph 19

(**4**) Article 13(1) was substituted by S.I. 1998/2795 (N.I. 18), Article 4

(**5**) Article 46(3) was amended by S.I. 1998/2795 (N.I. 18), Article 6(1) and Schedule 1, paragraphs 8 and 18

"the 2017 Regulations" means the Ionising Radiations Regulations (Northern Ireland) 2017(**6**);

"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;

"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 Executive's off-site emergency plan;

"dose" means, in relation to ionising radiation, any dose or sum of dose quantities to which an individual is exposed as a result of a radiation emergency;

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

"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 paragraphs 1 and 2 of Part 1 of Schedule 3 to 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, the Maritime and Coastguard Agency;

"emergency worker" means any person who has a defined responding role in an operator's emergency plan or an off-site emergency plan arranged by the Executive and who might be exposed to radiation as a result of a potential or actual radiation emergency;

"the Executive" means the Health and Safety Executive for Northern Ireland;

"existing exposure situation" means an exposure situation which does not call or no longer calls for the implementation of any protective action from an emergency plan;

"health authority" means the Regional Health and Social Care Board established under section 7 of the Health and Social Care (Reform) Act (Northern Ireland) 2009(**7**);

"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) docks, unloading quays, jetties, warehouses or similar structures, whether floating or not;

"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;

"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, it is determined that, by virtue of its physical and chemical form, it cannot cause a radiation

(**6**) S.R. 2017 No. 229
(**7**) 2009 c. 1 (N.I.)

emergency but does not include any radioactive substance that is or has been a component of a nuclear reactor;

"nuclear site licence" has the meaning assigned to it by section 1(1) of the Nuclear Installations Act 1965(**8**);

"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" is to be interpreted in accordance with regulation 10;

"outline planning zone" means a zone determined in accordance with regulation 9 and covered by the off-site emergency plan arranged by the Executive;

"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, or

(c) where a radioactive substance forms an integral part of a vessel and is used in connection with the operation of that vessel, includes when that vessel is at fixed point moorings or alongside berths, save that such a vessel is to be deemed separate premises only where 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;

"protective action" means an action or actions taken in order to prevent or reduce the exposure of emergency workers, members of the public, the environment or the contamination of property from ionising radiation in the event of a radiation emergency, and includes the provision of appropriate information to the public in accordance with regulations 20 and 21;

"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;

"radiation protection adviser" means a radiation protection adviser within the meaning of the 2017 Regulations and who is recognised as such for the purpose of regulation 14 of those Regulations;

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

"reference level" is to be interpreted in accordance with regulation 19;

"sealed source" means a source containing any radioactive substance whose structure is such as to prevent dispersion of radioactive substances into the environment;

(**8**) 1965 c. 57. Section 1 was substituted by paragraph 17 of Part 2 of Schedule 12 to the Energy Act 2013

"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, a person to whom a nuclear site licence has been granted,

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

(3) In these Regulations—

(a) any reference to an effective dose means the sum of the effective dose to the whole body from external ionising radiation and the committed effective dose from internal ionising 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 ionising 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 paragraphs (2) and (5) and with the exception of regulation 21, these Regulations apply to any work with ionising radiation which involves having on any premises, or providing for there to be on any premises, a radioactive substance containing more than the quantity specified in relation to that radionuclide in Schedule 1 or, in the case of fissile material, more than the mass of that material specified in Schedule 2.

(2) 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 a radiation emergency situation, an annual effective dose to persons off-site of greater than 1 mSv.

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

(a) an operator shall carry out an assessment to determine whether the quantity present on the premises allows an annual effective dose greater than that specified in paragraph (2); and

(b) if that assessment demonstrates that an annual effective dose greater than that specified in paragraph (2) 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 ("UN Model Regulations")(**9**), as revised or reissued from time to time;

(d) any radioactive substance which is in a package which complies with the requirements for a Type B(U) package, a Type B(M) package or a Type C package as set out in subsections 6.4.8, 6.4.9 or 6.4.10 of the UN Model Regulations respectively.

Hazard evaluation

4.—(1) The operator of any premises to which these Regulations apply shall 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) shall 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 shall take all reasonably practicable steps to—

(a) prevent the occurrence of a radiation emergency; and

(b) limit the consequences of any such emergency which does occur.

(5) The evaluation required by paragraph (1) also applies to the continuation of any work with ionising radiation carried out by an operator after the coming into operation of these Regulations.

(6) 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 (Northern Ireland) 2000(**10**) and to regulation 8 of the 2017 Regulations.

(7) The operator shall provide the Executive with details of the evaluation made under paragraph (1) within 28 days of the date on which it is made.

Consequences assessment

5.—(1) Where the evaluation undertaken under regulation 4 reveals the potential for a radiation emergency to occur, the operator shall 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 shall be completed within two months after the day on which the hazard evaluation required by regulation 4 is completed.

Review of hazard evaluation and consequences assessment

6.—(1) Where the operator proposes a material 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 shall make a further assessment to take account of that change.

(**9**) The Model Recommendations can be found at https://www.unece.org/trans/danger/publi/unrec/rev19/19files_e.html or can be inspected at the offices of the Department of Business, Energy and Industrial Strategy at 1 Victoria Street, London, SW1H 0ET.
(**10**) S.R. 2000 No. 388. Regulation 3 was amended by S.R. 2001 No. 348 and S.R. 2015 No. 265

(2) For such time as the work with ionising radiation in respect of which an evaluation made pursuant to regulation 4(1) continues, the operator shall, within 3 years of the date of the completion of the last evaluation (whether made in accordance with regulation 4(1) or this paragraph), or longer, if agreed by the Executive, 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 shall be provided to the Executive within 28 days of the making of the declaration.

(4) The further evaluation required by this regulation shall comply with the provisions of regulation 4(2) to (4).

Consequences report

7.—(1) Where the operator has made an assessment pursuant to regulation 5(1) or a review in accordance with regulation 6(1) or 6(2), unless regulation 6(2)(b) applies, the operator shall 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 shall send details of the assessment made under regulation 5 and the consequences report to the Executive—

(a) before the start of any of the work with ionising radiation to which the assessment relates; or

(b) where the report is as the result of a review in accordance with regulation 6, as soon as practicable after completion of the report.

(3) A consequences report shall include the particulars set out in Schedule 4.

(4) Following receipt of the consequences report by the Executive, the operator shall, within a reasonable period of time, offer a meeting to the Executive to discuss the consequences report.

(5) The operator shall comply with any reasonable request for information made by the Executive, following receipt of the consequences report, required by the Executive to enable it to arrange for the preparation of the off-site emergency plan, the preparation of which it is required to arrange under regulation 11, within 28 days of the date on which that information was requested.

Detailed emergency planning zone

8.—(1) The Executive shall determine the detailed emergency planning zone on the basis of the operator's recommendation made under paragraph 2 of Schedule 4 and may extend that area in consideration of—

(a) local geographic, demographic and practical implementation issues;

(b) the need to avoid, where practicable, the bisection of local communities; and

(c) the inclusion of vulnerable groups immediately adjacent to the area proposed by the operator.

(2) However, the Executive 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.

(3) The Executive shall inform the operator, within two months of having received the consequences report under regulation 7, of the determination made under paragraph (1).

(4) On receipt of the Executive's determination of the detailed emergency planning zone, the operator shall record the detailed emergency planning zone as finalised.

(5) The Executive may re-determine the detailed emergency planning zone—

(a) if there is a change in the local area which necessitates such a re-determination; or

(b) if the Executive deems it appropriate as a consequence of the operator's consequences report made after an evaluation in accordance with regulation 6(1) or 6(2)(a).

(6) If the Executive re-determines the detailed emergency planning zone in accordance with paragraph (5), it shall inform the operator as soon as reasonably practicable.

Outline planning zone

9.—(1) The outline planning zone shall be determined by the Executive following discussion with the operator

(2) The operator and the Executive may agree that the site has no outline planning zone.

(3) The planning to be arranged by the Executive in relation to the outline planning zone shall be commensurate to the risk of a radiation emergency affecting that area, and the off-site emergency plan required under regulation 11 shall 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 occur, the operator shall 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 the radiation emergencies identified by the evaluation.

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

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

(b) the consequences assessed in accordance with regulation 5, including any variable factors which might affect the severity of the emergency.

(3) The operator's emergency plan shall—

(a) contain the information set out in Part 1 of Schedule 5; and

(b) be drawn up in accordance with the principles and purposes set out in Schedule 6.

(4) The operator shall 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 Executive 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.

(5) The operator shall, 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 Executive;

(d) the health authority;

(e) the Public Health Agency(**11**);

(f) the emergency services; and

(g) such other persons, bodies or authorities as the operator considers appropriate.

(6) The operator shall ensure that any employee on site is or has been provided with such suitable and sufficient information, instruction and training as they require in relation to a radiation emergency.

(7) The operator shall ensure that any emergency worker 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;

(b) any equipment necessary to perform the functions allocated to them by the operator's emergency plan; and

(c) any equipment necessary to restrict their exposure to ionising radiation including, where appropriate, the issue of suitable dosemeters or other devices.

(8) In the case of a person who is not employed by the operator, the information, instruction, training and equipment required by paragraph (7) relates only to specialised equipment to be used on the operator's premises in accordance with the operator's emergency plan, and which the operator does not expect the person to have received or have available already.

(9) An operator which has prepared an emergency plan in accordance with this regulation shall—

(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 shall retain the emergency plan on the premises to which it relates, and shall provide details of that plan to the Executive upon request and within such reasonable time as the Executive may request.

Off-site emergency plan

11.—(1) Where premises require a planning zone under either or both of regulations 8 or 9, the Executive shall arrange for the preparation of an adequate off-site emergency plan covering that zone or zones.

(2) The plan required by paragraph (1) shall 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 shall—

(a) contain the information set out in Chapter 1 of Part 2 of Schedule 5 about the detailed emergency planning zone (where there is a detailed emergency planning zone);

(b) contain the information set out at Chapter 2 of Part 2 of Schedule 5 about the outline planning zone (where there is an outline planning zone);

(c) comply with Chapter 3 of Part 2 of Schedule 5; and

(d) be drawn up in accordance with the principles and purposes set out in Schedule 6.

(4) The off-site emergency plan shall be prepared within 8 months of the Executive's receipt of the consequences report and in any event before the operator commences work with ionising radiation to which the evaluation made in accordance with regulation 4(1) or 6(1) applies.

(5) For the purpose of arranging the preparation of an off-site emergency plan, pursuant to paragraph (1) or in reviewing such a plan pursuant to regulation 12(1), the Executive shall consult—

(**11**) The Public Health Agency is formally known as the Regional Agency for Public Health and Social Well-being, established by section 12 of the Health and Social Care (Reform) Act (Northern Ireland) 2009

(a) the operator of the premises to which the plan relates;

(b) the emergency services;

(c) the health authority;

(d) the Department of Agriculture, Environment and Rural Affairs;

(e) Public Health Agency; and

(f) such other persons, bodies or authorities as the Executive considers appropriate.

(6) The employer of any emergency worker who may be required to participate in the implementation of the off-site emergency plan shall ensure that each such emergency worker is 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 dosemeters or other devices.

(7) The Executive shall, as soon as reasonably practical after the preparation of the off-site emergency plan, confirm in writing to the operator that preparation of such a plan has taken place..

Reviewing and testing of emergency plans

12.—(1) An operator who has prepared an emergency plan pursuant to regulation 10 shall, at suitable intervals not exceeding 3 years, unless otherwise agreed by the Executive—

(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 plan to participate in the test to the extent necessary to ensure that the plan is effective.

(2) Where the Executive has arranged for the preparation of an off-site emergency plan pursuant to regulation 11, it shall, at suitable intervals not exceeding 3 years, unless otherwise decided by the Executive—

(a) arrange for the review and where necessary revision of the plan; and

(b) arrange for the testing of the plan, taking reasonable steps to arrange for all those with a role in the plan to participate in the test to the extent necessary to ensure that the plan is effective.

(3) The test required by paragraph (2)(b) need not extend to testing the off-site emergency plan, so far as it extends to the outline planning zone, unless a test is necessary in order to review or revise the plan, as required under paragraph (2)(a).

(4) The Executive 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 has sent a written request for such an extension of time to the Executive; and

(b) the written request is sufficient to demonstrate that the circumstances of the request are reasonable and exceptional.

(5) A review required under paragraphs (1) and (2) shall 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;

(e) any relevant information derived from an assessment of or a report about the effectiveness of an emergency plan required by regulation 16(6); and

(f) any relevant information derived from a report into the outcome of an earlier test as required by paragraph (9).

(6) In determining how the off-site emergency plan is to be tested, the Executive shall cooperate with—

(a) the operator; and

(b) the emergency services.

(7) A review or test of the plan, required by this regulation, shall 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 participation in emergency exercises at national and international level.

(8) The test of the plan required by paragraphs (1)(b) and 2(b) shall be adequate to test the ability to implement the plan in question, but the operator or the Executive, as the case may be, may for the purpose of determining the extent of that test, bear in mind—

(a) the length of time since the last test of the plan;

(b) the extent of the testing undertaken on the last occasion;

(c) any activation of the plan as a response to a radiation emergency since the last test; and

(d) any revisions of the plan made by the review required under paragraphs (1)(a) and 2(a).

(9) After completion of the test required by paragraph (1)(b), the operator shall—

(a) prepare a report on the outcome of the test within 3 months of the conclusion of the test; and

(b) send the report to the Executive within 28 days of its completion.

(10) After completion of the test required by paragraph (2)(b), the Executive shall—

(a) prepare a report on the outcome of the test within 3 months of the conclusion of the test; and

(b) send the report to the operator within 28 days of its completion.

Co-operation: operator and the Executive

13.—(1) The operator and the Executive shall co-operate in respect of their duties to prepare emergency plans to ensure that—

(a) the operator's emergency plan and the off-site emergency plan arranged by the Executive operate effectively both independently and in conjunction;

(b) communication between the operator and the Executive is expedited during any radiation emergency; and

(c) communication between the operator and the Executive and any organisation which is responding to the radiation emergency is expedited.

(2) The Executive shall, in particular, inform the operator which emergency services should be contacted in order to provide early warning of a radiation emergency as required by paragraph 1(f) of Schedule 5.

Consultation and co-operation: employers

14.—(1) In performing the duties imposed on an operator under regulations 4(1), 5(1), 6(1) and(2), 7(1) and 10, that operator shall 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 shall cooperate with the operator of those premises or the Executive by providing information or otherwise to the extent necessary to ensure that the operator or the Executive, as the case may be, is able to comply with the operator and the Executive's duty to arrange the preparation of an emergency plan.

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

(4) The co-operation required by an employer 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

15.—(1) The Executive may charge the operator a fee for the performance of the Executive's functions in relation to the off-site emergency plan relating to that operator's premises under regulations 8, 11, 12 and 20.

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

(3) When charging the operator a fee in accordance with paragraph (1), the Executive shall provide the operator with a detailed statement of the costs incurred, and the period to which the statement relates.

(4) The Executive'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 Executive in writing that it considers that its costs are unreasonable and requests additional information from the Executive concerning its costs.

(5) Additional information requested under paragraph (4) shall be provided by the Executive within 28 days from the day on which it received that request, and the period for payment of the fee provided under that paragraph is extended for a further period of two months from that date.

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

Implementation of emergency plans

16.—(1) An operator who has prepared an emergency plan pursuant to regulation 10 shall 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 paragraph (1), the operator shall at the same time inform the Executive that the operator has put its plan into effect.

(3) Where the Executive has arranged for the preparation of an off-site emergency plan pursuant to regulation 11 it shall take reasonable steps to put it or such parts of it as are necessary, into effect without delay when informed by the operator that—

(a) a radiation emergency has occurred; or

(b) 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 Executive, shall make a provisional assessment of the circumstances and consequences of such an emergency, and for this purpose shall consult—

(a) the emergency services;

(b) the health authority;

(c) The Public Health Agency;

(d) The Department of Agriculture, Environment and Rural Development; and

(e) any other persons, bodies or authorities which have functions under the operator's emergency plan, or the off-site emergency plan.

(5) The assessment required by paragraph (4) shall take place as soon as reasonably practicable in order to respond effectively to the particular characteristics of the radiation emergency

(6) The operator shall as soon as is reasonably practicable and in any event within 12 months, or such longer time as the Executive may agree, make a full assessment of the consequences of the radiation emergency or other event and the effectiveness of the emergency plans put into effect in accordance with paragraph (1).

(7) The Executive shall co-operate with the operator in making the operator's assessment of the effectiveness of the emergency plans as required by paragraph (6).

(8) The operator shall, within 28 days of the day on which the assessment made under paragraph (6) is completed, make a report of the findings of that 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.

(9) The operator shall provide the Executive with a copy of the report made under paragraph (8) within 28 days of the day on which it was completed.

Emergency exposures: employees

17.—(1) Where an emergency plan prepared pursuant to these Regulations provides for the possibility of any employee receiving an emergency exposure, each employer shall, 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 ionising 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 head (i) to be notified without delay to the employer and to the Executive;

(f) make arrangements, in respect of dose assessments to be carried out and notified pursuant to sub-paragraph (e), 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) to be subject to an emergency exposure and provide employees who are so authorised with appropriate training.

(2) Each employer shall notify the Executive of the dose levels which that employer 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) The notification required by paragraph (2) shall be made in advance of the first occasion on which the operator of the premises in which the employee works undertakes work with ionising radiation to which these Regulations apply.

(4) Where an employer 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 dose level should be determined, the employer shall, at least 28 days before formally determining the revised dose level, or within such shorter time as the Executive agrees, notify the Executive of the revised dose level which the employer considers is appropriate to be applied.

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

(6) Where an emergency plan is put into effect pursuant to regulation 16, each employer shall 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 the protective action taken in response to that radiation emergency prioritises keeping the dose level below the dose level determined in accordance with paragraphs (2), (4) or (5).

(7) The requirement imposed on the employer by paragraph (6)(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.

(8) The requirement imposed by paragraph (6)(c) shall not apply in respect of an exposure of any employee who—

(a) having been 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 sub-paragraph in order to save life, prevent severe health effects induced by ionising radiation, or to prevent the development of catastrophic conditions; 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.

(9) Where an employee has undergone an emergency exposure, the employer shall 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.

(10) An employer shall, at the request of that employer's employee in circumstances where a record has been created for the purpose of paragraph (9) 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.

(11) In the event of a report being made pursuant to regulation 16(6) 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)—

(a) until any person to whom the report relates has or would have attained the age of 75 years; and

(b) in any event, for at least 30 years from the termination of the work which gave rise to the emergency exposure.

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

Disapplication of dose limits

18. Except in relation to a perceived risk arising from a radiation emergency, regulation 12 of the 2017 Regulations shall not apply to an emergency worker, where that emergency worker—

(a) is engaged in preventing the imminent occurrence of a radiation emergency; or

(b) is acting to mitigate the consequences of a radiation emergency which it is expected will occur or which has occurred.

Reference levels

19.—(1) Where the operator has prepared, or the Executive has arranged for the preparation of an emergency plan in accordance with regulation 10 or 11, as the case may be, it shall ensure that the emergency plan prioritises keeping effective doses below a 100 mSv reference level.

(2) The operator or the Executive shall record in the emergency plan for which it is responsible the appropriate dose level for each emergency worker as determined by the employer in accordance with regulation 17(2).

(3) Where the response to a radiation emergency is underway, reference levels determined for emergency workers in accordance with regulation 17(2) may be revised or introduced in relation to specific tasks by that emergency worker's employer in order to optimise the response.

(4) In exceptional circumstances, in order to save life, to prevent severe radiation-induced health effects or to prevent the development of catastrophic conditions, a reference level for an effective dose for an emergency worker from external ionising radiation may be set by an employer in excess of 100 mSv but not exceeding 500 mSv.

(5) Where the response to a radiation emergency is underway, the determination of specific reference levels, to optimise the response, may be arranged by the Executive.

(6) In arranging for the determining of specific reference levels under paragraph (5), the Executive shall take advice from the person coordinating the off-site response to the radiation emergency.

(7) A Northern Ireland Department may also set a reference level in addition to any reference level set under paragraph (5).

(8) Any revision of the reference levels in response to a radiation emergency made in accordance with paragraph (3), (4), (5) or (7) must be recorded in the report required by regulation 16(6).

Prior information to the public

20.—(1) In relation to an area covered by an off-site emergency plan with a detailed emergency planning zone, the Executive shall, in co-operation with the operator, ensure that members of the public are made aware of the relevant information, and, where appropriate, are provided with it.

(2) In relation to an area covered by an off-site emergency plan with an outline emergency planning zone, the Executive shall, in co-operation with the operator, ensure that members of the public have access to the relevant information.

(3) The relevant information referred to in paragraphs (1) and (2) is—

(a) where the area is covered by a detailed emergency planning zone only, the information set out in Part 1 of Schedule 7 only;

(b) where the area is covered by an outline planning zone and a detailed emergency planning zone, the information set out in paragraphs 8 and 9 of Schedule 7 in addition to the information set out in Part 1 of Schedule 7;

(c) where the area is covered by an outline planning zone only, the information set out in Part 2 of Schedule 7.

(4) In preparing the information to be provided in accordance with paragraphs (1) and (2), the Executive shall consult such persons who seem to the Executive to be appropriate.

(5) The information to which members of the public are to be provided or to have access in accordance with paragraphs (1) and (2) shall be made available to them both electronically and in hard copy.

(6) The Executive shall review, and where necessary revise, the relevant information referred to in paragraph (3)—

(a) at regular intervals, but in any case not exceeding three years; and

(b) whenever significant changes to the protective action or authorities referred to in paragraphs 3, 4 and 5 of Schedule 7 take place.

(7) Where the information has been revised in accordance with paragraph (6) the Executive shall ensure that the revised information is made available to members of the public in accordance with paragraph (1) or (2) as appropriate.

(8) The operator shall not carry out the work with ionising radiation to which the evaluation made in accordance with regulation 4(1) or 6(1) applies before the information referred to in paragraph (3) is supplied.

(9) The Executive shall ensure that the information is made available in accordance with paragraph (1) or (2) again—

(a) at intervals not exceeding three years; and

(b) if it is revised pursuant to paragraph (6), as soon as reasonably practicable after the revision.

(10) Where a report is made pursuant to regulation 7, the Executive shall make that report available to the public as soon as reasonably practicable after it has been received under that regulation (except that, the Executive shall 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 the Executive to supply information to the public in the event of an emergency

21.—(1) The Executive shall prepare and keep up to date arrangements to supply, in the event of an emergency (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 the protective action applicable.

(2) The arrangements prepared and kept up to date under paragraph (1) shall 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 actually affected by the emergency.

(3) In preparing those arrangements and in keeping them up to date, the Executive shall consult any other authority likely to be responsible for implementing the relevant protective action referred to in Schedule 8 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) shall, if relevant to the type of emergency, include that specified in Schedule 8 and shall, in any event, mention the authority or authorities responsible for implementing the relevant protective action 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 protective action 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 have the same impact as a radiation emergency in Northern Ireland.

Retention of information

22. Each operator who has duties by virtue of these Regulations shall retain the information they are required to prepare, in particular under regulations 4 to 12 and 16, and shall produce that information if requested to do so by the Executive or a Northern Ireland Department.

Radiation protection adviser

23.—(1) Every employer which carries out work with ionising radiation shall consult one or more suitable radiation protection advisers about occupational and public exposure to assist with that employer's preparations for responding to radiation emergency situations.

(2) Where an employer consults a radiation protection adviser pursuant to the requirements of paragraph (1) (other than in respect of the observance of that paragraph), the employer shall appoint that radiation protection adviser in writing and shall include in that appointment the scope of the advice which the radiation protection adviser is required to give as if the employer were an employer under the 2017 Regulations.

(3) The employer shall provide any radiation protection adviser appointed by it with adequate information and facilities for the performance of the radiation protection adviser's functions arising from their consultation or appointment under this regulation.

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(**12**); and

(**12**) 1952 c. 67

(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(**13**).

(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.

(3) The requirements of regulation 17 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 (Northern Ireland) 2001(**14**) are revoked.

Transitional and savings provisions

27.—(1) Any person who had a duty under the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2001 ("the 2001 Regulations") prior to these Regulations coming into operation may continue to comply with the provisions of the 2001 Regulations instead of the provisions of these Regulations, notwithstanding the revocation made in regulation 26, until the end of 31st October 2020.

(2) A person who had a duty under the 2017 Regulations, but not the 2001 Regulations, prior to these Regulations coming into operation shall not be subject to a duty under these Regulations until the end of 31st October 2020.

(3) From the start of 1st November 2020, these Regulations shall be complied with in full, save that—

(a) any test of an emergency plan carried out in the three years prior to the coming into operation date is to be treated as though it were a test undertaken pursuant to regulation 12; and

(b) within 6 months of the coming into operation date, if an operator has complied with its obligations under these Regulations in full, that operator may continue to work with

(**13**) 1964 c. 5
(**14**) S.R. 2001 No. 436

ionising radiation or commence work with ionising radiation, as the case may be, although the Executive has not arranged for the preparation of an off-site emergency plan as required by these Regulations, where the Executive, exceptionally, determines that it would be reasonable so to do.

Consequential amendments

28. Schedule 9 makes amendments consequential upon these Regulations.

Sealed with the Official Seal of the Department for the Economy on 26th September 2019.

L.S.

Colin Jack
A senior officer of the Department for the Economy

SCHEDULE 1 Regulation 3(1)

PART 1

Table of radionuclides

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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		

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
	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}

Radionuclide	*Form*	*Activity (Bq)*
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		

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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-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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
	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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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}

Radionuclide	*Form*	*Activity (Bq)*
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

For the purpose of regulation 3(4), 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—

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

SCHEDULE 2

Regulation 3(1)

Fissile material

For the purpose of regulation 3(1), the specified mass of a fissile material set out below is—

(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 U-233 – 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(1)

Consequences Assessment

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

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

3. The calculations undertaken in support of the assessment shall consider a range of weather conditions (if weather conditions are capable of affecting the extent of the impact of the radiation emergency) to account for—

(a) the likely consequences arising from such conditions; and

(b) consequences which are less likely, but with greater impact.

4. The assessment shall consider the consequences of the potential radiation emergencies identified in regulation 4 on the population within the geographical extent of the potential radiation emergency, accounting for different characteristics, including, for example age and other characteristics which would render specific members of the public especially vulnerable.

5. The assessment shall consider what would be an effective and, where relevant, equivalent dose to the thyroid in the context of each potential radiation emergency identified.

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

7. The assessment shall identify any protective action that may need to be taken for the range of potential radiation emergencies.

8. The assessment shall assess the consequences of suitable and sufficient source terms by distance and by exposure pathway, and the distances to which protective action would be required based on the United Kingdom's Emergency Reference Levels, published by Public Health England(**15**).

9. In this Schedule "source term" means the radioactivity which could give rise to direct external exposures from the premises or which could be released to the environment in a radiation emergency and, for releases, includes—

(a) the amount of each radionuclide released;

(b) the time distribution of the release;

(c) the energy associated with atmospheric release; and

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

SCHEDULE 4

Regulation 7(3)

Particulars to be included in a consequences report

PART 1

Factual Information

1. The following factual information shall 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.

(**15**) Available at https://www.gov.uk/government/publications/radiation-emergency-reference-levels or in hard copy from the Department for Business, Energy and Industrial Strategy, 1 Victoria Street, London, SW1H 0ET. The functions of the National Radiological Protection Board were transferred to the Health Protection Agency by section 3 of the Health Protection Act 2004 (c. 17). The Health Protection Agency was abolished by section 56 of the Health and Social Care Act 2012 (c. 7) and its functions are now exercised by Public Health England.

PART 2

Recommendations

2. The operator shall include the following recommendations in the consequences report—

(a) the proposed minimum geographical extent from the premises to be covered by the off-site emergency plan arranged by the Executive; and

(b) the minimum distances to which urgent protective action may need to be taken, marking against each distance the timescale for implementation of the relevant action.

3. In relation to a minimum geographical extent recommended under paragraph 2, the operator shall 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; and

(b) details of the environmental pathways at risk in order to support the determination of food and water restrictions in the event of a radiation emergency.

PART 3

Rationale

4. The operator shall set out the rationale supporting each recommendation made in the consequences report.

5. In particular, the operator shall set out—

(a) the rationale for its recommendation on the minimum distances for which urgent protective action may need to be taken; and

(b) where the operator and the Executive have agreed that no off-site planning is required, and therefore no emergency planning is recommended, the rationale for that agreement.

SCHEDULE 5

Regulations 10(3) 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(3) is as follows—

(a) the arrangements to set emergency procedures in motion;

(b) the arrangements to co-ordinate the on-site mitigatory action;

(c) the name or position of the person with responsibility for liaison with the Executive;

(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 protective action persons are expected to take on receipt of a warning;

(f) the arrangements for providing early warning of the incident to the emergency services, identified in the off-site emergency plan to set the off-site emergency planning 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 Executivewith its off-site protective action;

(h) the arrangements for providing information about the incident to the Executive;

(i) the arrangements for dealing with emergency exposures including the dose levels which have been determined as appropriate for the purposes of putting into effect the emergency plan;

(j) the arrangements to prioritise keeping doses within the reference levels set out in regulation 19(1);

(k) any specific arrangements which take account of lessons learned from past emergency situations, whether at the operator's premises or otherwise;

(l) what protective action is proposed to be taken, and how far each such action extends within any detailed emergency planning zone; and

(m) 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, what information they are to receive and when.

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 arrangements to set emergency procedures in motion;

(b) the arrangements to co-ordinate the off-site protective 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 protective 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 dealing with 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 keeping the doses within the reference levels set out at regulation 19(1);

(j) any specific arrangements which take account of lessons learned from past emergency situations, whether at the operator's premises or otherwise;

(k) the arrangements for carrying out an assessment of the impacts of the radiation; and

(l) the arrangements which the Executive 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 2; and

(b) in all cases—

(i) at what stage and how the response to a radiation emergency triggers a response within the outline planning zone; and

(ii) whether there are any areas of detailed planning within the outline planning zone and, if so, the detailed planning arrangements in respect of any such area.

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 which an off-site emergency plan shall contain

5. In order to comply with regulation 11(3)(c) an off-site emergency plan shall—

(a) set out the extent of the detailed emergency planning zone (if any) 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; and

(ii) 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 consequences 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 6 Regulations 10(3) and 11(3)

Principles and purposes of emergency plans

PART 1

Principles to which emergency plans shall have regard

1. Any person with responsibility for preparing an emergency plan under these Regulations shall 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 to an existing exposure situation than to increase its duration or consequences, 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; and

(d) the necessity of ensuring that an appropriate balance is struck between the expected harms and benefits of any particular protective action so as to maximise the benefit of that action.

PART 2

Purposes of emergency plans

2. Any person with responsibility for preparing an emergency plan under these Regulations shall ensure that the plan, if implemented, would fulfil the following purposes—

(a) to reduce or stop the effects of the radiation emergency;

(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 radiation emergency; and

(d) to prioritise the implementation of the plan in relation to any person exposed to a dose in excess of the reference levels set out in regulation 19.

SCHEDULE 7

Regulation 20(3)

Prior information for members of the public

PART 1

Information in relation to detailed emergency planning zones

1. Basic facts about ionising 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. Protective action envisaged to alert, protect and assist the general public in the event of a radiation emergency.

4. Appropriate information on protective action to be taken by the general public in the event of a radiation emergency.

5. The authority or authorities responsible for implementing the protective 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.

9. 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 5.

SCHEDULE 8

Regulation 21(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 protective action 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. Details concerning any announcements recommending cooperation with instructions or requests by the Executive.

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.

6. In paragraph 4(b), "establishments with particular collective responsibilities" means hospitals, care homes, schools or similar establishments.

SCHEDULE 9

Regulation 28

Consequential amendments

Motor Vehicles (Construction and Use) Regulations (Northern Ireland) 1999

1. Regulation 44 of the Motor Vehicles (Construction and Use) Regulations (Northern Ireland) 1999(**16**) is amended as follows—

(a) in paragraph (5)(k) omit "radiation accident or" in both places it occurs; and

(b) in paragraph (9A) for the definition of "radiation accident" and "radiation emergency" substitute—

> ""radiation emergency" has the same meaning as in the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019.".

Road Vehicles Lighting Regulations (Northern Ireland) 2000

2. Regulation 2 of the Road Vehicles Lighting Regulations (Northern Ireland) 2000(**17**) is amended as follows—

(a) in the definition of "emergency vehicle" omit "radiation accident or" in both places it occurs; and

(b) for the definition of "radiation accident" and "radiation emergency" substitute—

> ""radiation emergency" has the same meaning as in the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019.".

Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005

3. In regulation 12(f) of the Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005(**18**) for "Radiation (Emergency Preparedness and Public Information) Regulations (Northern

(**16**) S.R. 1999 No. 454. Regulation 44 was amended by S.R. 2007 No. 238. There are other amendments, but none are relevant to this rule.
(**17**) S.R. 2000 No. 169. Regulation 2 was amended by S.R. 2007 No. 239. There are other amendments, but none are relevant to this rule.
(**18**) S.I. 2005/2042. Regulation 12 has been amended, but that amendment is not relevant to this rule.

Ireland) 2001" substitute "Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019".

Radioactive Contaminated Land Regulations (Northern Ireland) 2006

4. In regulation 7(a) of the Radioactive Contaminated Land Regulations (Northern Ireland) 2006(**19**) for "paragraph (2) of regulation 13 (implementation of emergency plans) of the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2001" substitute "paragraph (3) of regulation 16 (implementation of emergency plans) of the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019".

Ionising Radiations Regulations (Northern Ireland) 2017

5.—(1) In regulation 36(1) of the Ionising Radiations Regulations (Northern Ireland) 2017(**20**) for "Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2001" substitute "Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019".

(2) In Schedule 10, paragraph 4(2) for the definition of "pipeline works"—

(a) for head "(h)" substitute "(a)";

(b) for head "(i)" substitute "(b)";

(c) for head "(j)" substitute "(c)";

(d) for head "(k)" substitute "(d)";

(e) for head "(l)" substitute "(e)"; and

(f) for head "(m)" substitute "(f)".

Ionising Radiation (Basic Safety Standards) (Miscellaneous Provisions) Regulations 2018

6. In regulation 4(2)(b) of the Ionising Radiation (Basic Safety Standards) (Miscellaneous Provisions) Regulations 2018(**21**) for "paragraph (2) of regulation 13 (implementation of emergency plans) of the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2001" substitute "paragraph (3) of regulation 16 of the Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019".

EXPLANATORY NOTE

(This note is not part of the Regulations)

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

(**19**) S.R. 2006 No. 345. Regulation 7 was substituted by S.R. 2007 No. 3236. Other amendments have been made but none are relevant to this rule.
(**20**) S.R. 2017 No. 229. Amendments have been made but none are relevant to this rule.
(**21**) S.I. 2018/482. Amendments have been made but none are relevant to this rule.

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 Executive. Both the Executive 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 Northern Ireland provisions of Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ No L13, 17.1.2014, p 1).

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 shall, 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 protective action.

Regulation 5 provides that, where an operator has identified the potential for a radiation emergency pursuant to its evaluation, the operator shall make a further assessment in accordance with Schedule 3 to evaluate a 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 shall 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 Executive, which includes a proposed detailed emergency planning zone, and shall discuss those consequences with the Executive.

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

Regulation 13 provides for cooperation between the operator and the Executive in fulfilling their duties to prepare emergency plans, and regulation 14 provides for cooperation between operators and other employers on the same premises.

Regulation 15 provides that the Executive may charge the operator for performing its functions in relation to the preparation and testing of an off-site emergency plan.

Regulation 16 sets out when operators and the Executive should implement their emergency plans and who should be informed about that implementation. Regulation 16 also provides for a full assessment of the consequences of any radiation emergency which occurs and the effectiveness of the emergency plans after any implementation.

Regulation 17 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 18 disapplies regulation 12 of the Ionising Radiations Regulations (Northern Ireland) 2017 to an emergency worker who is engaged in preventing or mitigating the consequences of a radiation emergency.

Regulation 19 provides that the operator's emergency plans and the Executive's off-site emergency plans shall prioritise reducing doses below 100 mSv. When the response to a radiation emergency is underway, specific reference levels for the public may be determined by the Executive, who may seek advice from the person coordinating the off-site response to that emergency. In exceptional circumstances, the reference level for emergency workers may be set in excess of 100 mSv, but not exceeding 500 mSv.

Regulations 20 and 21 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 22 provides for the retention of information by the operator and the Executive.

Regulation 23 contains provisions requiring employers to consult radiation protection advisors where the employer is engaged in work with ionising radiation for the purposes of the radiation protection advisor to advise on compliance with these Regulations.

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 (Northern Ireland) 2001, subject to the transitional and savings provisions set out in regulation 27.

Regulation 28 and Schedule 9 provide for consequential amendments.

In Great Britain the corresponding Regulations are the Radiation (Emergency Preparedness and Public Information) Regulations 2019 (S.I. 2019/703). As impact to Northern Ireland industry will be mainly restricted to one-off familiarisation with the revised provisions and costs to individual dutyholders will be negligible, a Regulatory Impact Assessment is not required. A copy of the transposition note can be obtained from the Health and Safety Executive for Northern Ireland, 83 Ladas Drive, Belfast, BT6 9FR. A copy of this document is annexed to the Explanatory Memorandum, which is available alongside these Regulations at www.legislation.gov.uk.