

SCHEDULE 3

Regulation 19(2) and (3)

MONITORING

PART A

Monitoring programmes

1. Each monitoring programme must—
 - (a) verify that—
 - (i) the measures in place to control risks to human health throughout the water supply chain (from the catchment area through abstraction, treatment and storage to distribution) are working effectively; and
 - (ii) water at the point of compliance meets the water quality standards;
 - (b) provide information on the quality of water supplied to demonstrate that—
 - (i) the water quality standards are being met; and
 - (ii) the parametric values in Table C are not being exceeded; and
 - (c) identify the most appropriate means of mitigating the risks to human health.
- 2.—(1) Each monitoring programme must fulfil the requirements of Part B of this schedule (and, where applicable, Part C of this schedule) by means of—
 - (a) the collection and analysis of the quality of discrete water samples; or
 - (b) measurements of the quality of water recorded by a continuous monitoring process.(2) In addition, monitoring programmes may consist of—
 - (a) inspections of records of the functionality and maintenance status of equipment; and
 - (b) inspections of the catchment area, water abstraction, treatment, storage and distribution infrastructure.
3. An enforcing authority must ensure that each monitoring programme prepared by it is reviewed on a continuous basis, and updated or reconfirmed at least every 5 years.

PART B

Standard parameters and frequencies

- 1.—(1) Each monitoring programme must take into account—
 - (a) each parameter; and
 - (b) any other micro-organism, parasite or substance which needs to be monitored by virtue of regulation 18(2) or (3),including those that are important for assessing the impact of any part of a private water supply system on the quality of water at a point of compliance.
 - (2) When choosing appropriate parameters and other micro-organisms, parasites or substances for monitoring (as required by, or in accordance with, this schedule), local conditions for each private water supply system must be taken into consideration.

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2.—(1) The following parameters (“Group A parameters”) must be monitored at least at the minimum frequencies determined in accordance with the table in paragraph 3:—

- (a) *Escherichia coli*, coliform bacteria, colony count 22 °C, colour, turbidity, taste, odour, hydrogen ion concentration (pH), and conductivity; and
- (b) any other parameter, or other micro-organism, parasite or substance, (except radon, tritium and indicative dose) identified as relevant in the monitoring programme—
 - (i) by virtue of regulation 18(2) (as read with regulation 19(2)(a)); or
 - (ii) where relevant, through a risk assessment.

(2) Ammonium and nitrite must be included as Group A parameters, if chloramination is used.

(3) Aluminium and iron must be included as Group A parameters, if used as water treatment chemicals.

3.—(1) Other parameters, except radon, tritium and indicative dose, (“Group B parameters”) must be monitored at least at the frequencies determined in accordance with the table below.

(2) In the table, “Group A parameters” is to be construed in accordance with paragraph 2.

Minimum frequency of sampling and analysis for compliance monitoring

<i>Volume of water (in m³) distributed or produced each day within a supply zone (Notes 1 and 2)</i>		<i>Group A parameters: number of samples per year</i>	<i>Group B parameters: number of samples per year</i>
> 0	≤ 100	1	1
> 100	≤ 1,000	4	1
> 1,000	≤ 10,000	4 for the first 1,000 m ³ /day of the total volume, plus 3 for each additional 1,000 m ³ /day and part thereof	1 for the first 1,000 m ³ /day of the total volume, plus 1 for each additional 4,500 m ³ /day and part thereof
> 10,000	≤ 100,000	4 for the first 1,000 m ³ /day of the total volume, plus 3 for each additional 1,000 m ³ /day and part thereof	3 for the first 10,000 m ³ /day of the total volume, plus 1 for each additional 10,000 m ³ /day and part thereof
> 100,000		4 for the first 1,000 m ³ /day of the total volume, plus 3 for each additional 1,000 m ³ /day and part thereof	12 for the first 100,000 m ³ /day of the total volume, plus 1 for each additional 25,000 m ³ /day and part thereof

Note 1: The volumes are calculated as averages taken over a year.

Note 2: The number of inhabitants in a supply zone may be used instead of the volume of water to determine the minimum frequency, assuming water consumption of 0.2 m³/day per person.

4.—(1) A sample of water must be taken at least annually at a point of compliance for each private water supply system, and analysed for—

- (a) enterococci, *Escherichia coli*, coliform bacteria, colony count 22 °C, colour, turbidity, *Clostridium perfringens* and hydrogen ion concentration (pH);

- (b) copper, iron, lead, manganese, nickel and zinc;
- (c) where the water is supplied to premises within a nitrate vulnerable zone, nitrate; and
- (d) any other parameter, or other micro-organism, parasite or substance, identified (for the time being) as relevant in the monitoring programme in relation to a supply of water—
 - (i) by virtue of regulation 18(2) (as read with regulation 19(2)(a)); or
 - (ii) where relevant, through a risk assessment.

(2) In sub-paragraph (1) “nitrate vulnerable zone” means any area of land designated as a nitrate vulnerable zone by regulation 2 of the Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2015(1).

PART C

Deviation from standard parameters and frequencies

1. An enforcing authority may (or, where required, must), in accordance with this Part, deviate from the requirements of paragraphs 2, 3 and 4 in Part B of this schedule.

2. Based on the results of a risk assessment, the list of parameters in Part B of this schedule (including any micro-organism, parasite or substance referred to in paragraph 2(1)(b) of that Part), must be extended and/or the minimum sampling frequencies under that Part increased if—

- (a) the list of parameters or frequencies required to be monitored under that Part B is not sufficient to fulfil the obligations imposed by regulation 18(1), (3) and (4);
- (b) additional monitoring is required by regulation 18(2); or
- (c) this is necessary to verify the matters in paragraph 1(a) of Part A of this schedule.

3. Subject to paragraph 4, based on the results of a risk assessment the list of parameters in Part B of this schedule (including any micro-organism, parasite or substance referred to in paragraph 2(1)(b) of that Part) and the sampling frequencies under that Part B may be reduced, provided that the following conditions are met:—

- (a) the frequency of sampling for *Escherichia coli* must not be reduced below the minimum frequency required by that Part B; and
- (b) for other parameters in the list—
 - (i) the location and frequency of sampling must be determined in relation to the parameter’s origin, as well as the variability and long-term trend of its concentration, taking into account the water quality standards;
 - (ii) to reduce the minimum sampling frequency for a parameter under Part B of this schedule, the results obtained from samples collected at regular intervals over a period of at least 3 years from sampling points representative of the whole supply zone must all be less than 60 % of the parametric value;
 - (iii) to remove a parameter from the list of parameters to be monitored under Part B of this schedule, the results obtained from samples collected at regular intervals over a period of at least 3 years from points representative of the whole supply zone must all be less than 30 % of the parametric value; and
 - (iv) the removal of a parameter from the list of parameters to be monitored under Part B of this schedule must be based on the result of the risk assessment, informed by the results of monitoring of sources of water and confirming that human health is protected from the adverse effects of any contamination of water.

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4.—(1) The minimum sampling frequency for a parameter under Part B of this schedule (including for a micro-organism, parasite or substance referred to in paragraph 2(1)(b) of that Part) may be reduced under paragraph 3(b)(ii) only if the risk assessment confirms that no factor (that can be reasonably anticipated) is likely to cause deterioration of the quality of the water.

(2) Any such parameter may be removed from the list of parameters to be monitored by an enforcing authority under paragraph 3(b)(iii) only if—

- (a) the risk assessment confirms that no factor (that can be reasonably anticipated) is likely to cause deterioration of the quality of the water; and
- (b) the Drinking Water Quality Regulator for Scotland, by notice to the enforcing authority, consents to the removal of the parameter from the list of parameters to be monitored in relation to a supply of water (or in relation to more than one supply of water), and that consent has not been revoked under sub-paragraph (3).

(3) The Drinking Water Quality Regulator for Scotland may, by notice to the enforcing authority, revoke with immediate effect any consent given by it under sub-paragraph (2)(b).

PART D

Sampling methods and sampling points

1.—(1) Sampling points, in relation to water, must be determined by the enforcing authority so as to ensure that the results of the analysis of discrete water samples collected at those points will establish whether or not the water meets the water quality standards at each point of compliance.

(2) In the case of a supply of water in pipes to any premises used for a commercial or public activity, the sampling points must include a point of compliance within each premises.

(3) In the case of a supply of water in pipes to premises (including any premises used for a commercial or public activity), an enforcing authority may take samples of the water within the supply zone or at a treatment works for a particular parameter—

- (a) if it can be demonstrated that there would be no adverse change to the measured value of the parameter concerned; and
- (b) in the case of any premises used for a commercial or public activity, the Drinking Water Quality Regulator for Scotland, by notice to the enforcing authority, consents to the samples being taken within the supply zone or at the treatment works for the particular parameter, and that consent has not been revoked under sub-paragraph (6).

(4) In a case where an enforcing authority may take samples of the water within the supply zone or at a treatment works for a particular parameter, the point at which the samples are taken is to be treated for the purposes of these Regulations as the point of compliance for the parameter.

(5) As far as possible, the number of samples must be distributed equally in time and location.

(6) The Drinking Water Quality Regulator for Scotland may, by notice to the enforcing authority, revoke with immediate effect any consent given by it under sub-paragraph (3)(b).

2. Subject to paragraph 1, sampling at the point of compliance must meet the following requirements:—

- (a) a sample for copper, lead or nickel must be taken at the consumer's tap without prior flushing;
- (b) a sample for any such parameter or any other chemical parameter must—
 - (i) be a random daytime sample of one litre volume; or

- (ii) use a fixed stagnation time method that better reflects the national situation, provided that, at the supply zone level, this does not result in fewer cases of non-compliance than using the random daytime method; and
 - (c) a sample for microbiological parameters at the point of compliance must be taken and handled in accordance with sampling purpose B of European standard EN ISO 19458:2006 entitled “*Water quality - Sampling for microbiological analysis (ISO 19458:2006)*”(2).
3. Sampling of water in a private water supply system, with the exception of sampling at the consumer’s tap, must be in accordance with international standard ISO 5667-5:2006 entitled “*Water quality. Sampling. Guidance on sampling of drinking water from treatment works and piped distribution systems*”(3).
4. For microbiological parameters, sampling of water in a private water supply system must be taken and handled in accordance with sampling purpose A of European standard EN ISO 19458:2006 entitled “*Water quality - Sampling for microbiological analysis (ISO 19458:2006)*”.

PART E

Radioactive substances

General principles and monitoring frequencies

- 1.—(1) Subject to sub-paragraph (2), each enforcing authority in relation to a supply of water must ensure that the water is monitored for radon, tritium and indicative dose.
- (2) Where the Scottish Ministers, by notice to the enforcing authority, confirm that they have established that radon, tritium or, as the case may be, indicative dose is not likely to be present in relation one or more supplies of water, for a period specified in the notice, in concentrations which could exceed the parametric value for the parameter, the enforcing authority is not required to monitor any such supply of water for the parameter during the period specified.
- (3) In case of naturally occurring radionuclides—
- (a) where previous results show that the concentration of radionuclides in one or more supplies of water is stable, the minimum sampling and analysis frequencies are to be decided by the Scottish Ministers, and confirmed by notice to the enforcing authority, taking into consideration the risk to human health; and
 - (b) where the Scottish Ministers, by notice to the enforcing authority, confirm that they are satisfied (on the basis of representative surveys, monitoring data or other reliable information) that levels of radon, tritium and the calculated indicative dose in one or more supplies of water will, for a period specified in the notice, remain below the parametric value for each parameter at the point of compliance, the enforcing authority is not required to monitor any such supply for these parameters during the period specified.
- (4) Where sub-paragraph (3)(b) applies, the Scottish Ministers must communicate the grounds for the decision to the European Commission and provide the Commission with the necessary documentation supporting that decision, including the findings of any surveys, monitoring or investigations carried out.

(2) This standard was approved by the European Committee for Standardization (CEN) on 1st July 2006. Under reference BS EN ISO 19458, it is published as a UK standard by the British Standards Institution (ISBN 0 580 49136 6).

(3) This standard was approved by the International Organization for Standardization (ISO). Under reference BS ISO 5667-5:2006, it is published as a UK standard by the British Standards Institution (ISBN 0 580 47140 3).

Radon

2.—(1) Subject to paragraphs 5 and 6, the enforcing authority must ensure that representative surveys are undertaken to determine the scale and nature of likely exposures to radon in the water originating from different types of ground water sources and wells in different geological areas.

(2) The surveys must be designed in such a way that underlying factors, and especially the geology and hydrology of the area, radioactivity of rock or soil, and well type, can be identified and used to direct further action to areas of likely high exposure.

(3) Monitoring of radon concentrations must be carried out if the enforcing authority has reason to believe, on the basis of the results of the representative surveys or other reliable information, that the parametric value for radon might be exceeded.

Tritium

3.—(1) Subject to paragraphs 5 and 6, the enforcing authority must monitor the water for tritium where—

- (a) an anthropogenic source of tritium or other artificial radionuclides is present within the catchment area for the supply; and
- (b) it cannot be shown on the basis of other surveillance programmes or investigations that the level of tritium is below the parametric value for tritium.

(2) Where monitoring for tritium is required by sub-paragraph (1), samples must be taken in accordance with paragraph 6.

(3) If the concentration of tritium in any such sample exceeds the parametric value for tritium, the enforcing authority must carry out an investigation of the presence of other artificial radionuclides.

Indicative dose

4.—(1) The enforcing authority must monitor the water for indicative dose where—

- (a) a source of artificial radioactivity or elevated natural radioactivity is present; and
- (b) it cannot be shown on the basis of other representative monitoring programmes or other investigations that the indicative dose is below the parametric value for that parameter.

(2) Where sub-paragraph (1) requires monitoring (of radionuclide levels) only in relation to a source of artificial radioactivity, samples must be taken in accordance with paragraph 6.

(3) Where sub-paragraph (1) requires monitoring (of radionuclide levels) in relation to a source of elevated natural radioactivity, the enforcing authority must determine the frequency of the monitoring required of—

- (a) gross alpha activity;
- (b) gross beta activity; or
- (c) individual natural radionuclides,

depending on the screening strategy adopted pursuant to Part B of this schedule.

(4) Where sub-paragraph (3) applies, the frequency determined may vary from a single check measurement to the frequency which would otherwise apply by virtue of paragraph 6.

(5) Where a single check for natural radioactivity is specified under sub-paragraph (3), the enforcing authority must carry out a further check if any change occurs in relation to the supply which is likely to influence the concentrations of radionuclides in the supply.

Water treatment

5. Where the water is treated to reduce the level of radionuclides, the enforcing authority must monitor the water for indicative dose, radon and tritium in accordance with paragraph 6 to verify the continued efficacy of that treatment.

Minimum sampling and analysis frequencies

6. The minimum sampling and analysis frequency for the monitoring of radon, tritium and indicative dose in water (where required by this schedule) from a private water supply system or from a tanker or used in a food production undertaking is set out in the following table.

<i>Volume of water (in m³) distributed or produced each day within a supply zone (Note 1)</i>		<i>Number of samples per year (Notes 2 and 3)</i>
> 0	≤ 100	1
> 100	≤ 1,000	1
> 1,000	≤ 10,000	1, plus 1 for each 3,300 m ³ /day and part thereof of the total volume
> 10,000	≤ 100,000	3, plus 1 for each 10,000 m ³ /day and part thereof of the total volume
> 100,000		10, plus 1 for each 25,000 m ³ /day and part thereof of the total volume

Note 1: The volumes are calculated as averages taken over a year. The number of inhabitants in a supply zone may be used instead of the volume of water to determine the minimum frequency, assuming water consumption of 200 litres/day per person.

Note 2: As far as possible, the number of samples must be distributed equally in time and location.

Note 3: In the event of intermittent short-term supply the monitoring frequency of water distributed by tankers must be decided by each enforcing authority in relation to the water.

Averaging

7. Where the parametric value for radon, tritium or, as the case may be, indicative dose is exceeded in a sample of the water, the Drinking Water Quality Regulator for Scotland must specify, by notice to the enforcing authority, the extent of resampling necessary to ensure that the measured values are representative of an average activity concentration for a full year.

PART F

Indicative dose

Monitoring for compliance with the indicative dose

1.—(1) Each enforcing authority, in relation to water, may use reliable screening strategies to indicate the presence of radioactivity in the water.

(2) These strategies may include screening for—

(a) certain radionuclides or an individual radionuclide; or

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- (b) gross alpha activity or gross beta activity.

Screening for certain radionuclides or for an individual radionuclide

2.—(1) Where screening of the water is carried out for certain radionuclides or for an individual radionuclide, the enforcing authority must carry out an analysis of additional radionuclides if, in relation to any supply referred to in paragraph 1—

- (a) one of the activity concentrations of a radionuclide in the second column of the table below exceeds 20% of the corresponding derived concentration in the third column; or
(b) the tritium concentration exceeds the parametric value for tritium.

(2) The enforcing authority must, in deciding which radionuclides require to be measured for each supply, take into account all relevant information about likely sources of radioactivity.

<i>Origin</i>	<i>Radionuclide</i> (<i>Note 1</i>)	<i>Derived concentration (Bq/l)</i>	<i>Notes</i>
Natural	U-238	3.0	Note 2
	U-234	2.8	Note 2
	Ra-226	0.5	
	Ra-228	0.2	
	Pb-210	0.2	
	Po-210	0.1	
Artificial	C-14	240	
	Sr-90	4.9	
	Pu-239 / Pu-240	0.6	
	Am-241	0.7	
	Co-60	40	
	Cs-134	7.2	
	Cs-137	11	
	I-131	6.2	

Note 1: This table includes values for the most common natural and artificial radionuclides. These are precise values, calculated for a dose of 0.1 mSv, an annual intake of 730 litres and using the dose coefficients laid down in Table (A) of Annex III to Council Directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation⁽⁴⁾. Derived concentrations for other radionuclides may be calculated on the same basis.

Note 2: This allows only for the radiological properties of uranium, not for its chemical toxicity.

(4) OJ L 159, 29.6.1996, p. 1., as amended by Corrigendum (OJ L 314, 4.12.1996, p. 20).

Screening for gross alpha activity and gross beta activity

3.—(1) The enforcing authority may use screening strategies for gross alpha activity and gross beta activity (or, where appropriate, residual beta activity after subtraction of the potassium-40 activity) to monitor the water for indicative dose.

(2) Subject to sub-paragraph (3), screening levels must be set at—

- (a) 0.1 Bq/l for gross alpha activity; and
- (b) 1.0 Bq/l for gross beta activity.

(3) The enforcing authority may set alternative levels to those specified in sub-paragraph (2) if it can demonstrate that these will ensure that an indicative dose of 0.1 mSv is not exceeded.

(4) If the gross alpha activity is less than 0.1 Bq/l and the gross beta activity is less than 1.0 Bq/l, the enforcing authority may assume that the indicative dose is less than 0.1 mSv.

(5) Where sub-paragraph (4) applies, the enforcing authority is not required to carry out a radiological investigation unless it is aware—

- (a) that specific radionuclides are present in the water; and
- (b) that these are liable to cause an indicate dose in excess of 0.1 mSv.

(6) If the gross alpha activity exceeds 0.1 Bq/l or the gross beta activity exceeds 1.0 Bq/l, the enforcing authority must carry out an analysis for specific radionuclides.

(7) The enforcing authority must, in deciding which radionuclides require to be measured for the purposes of sub-paragraph (6), take into account all relevant information about likely sources of radioactivity.

(8) If elevated levels of tritium are detected in a sample, the enforcing authority must also measure the gross alpha activity and gross beta activity in that sample.

Calculation of the indicative dose

4.—(1) The indicative dose must be calculated from—

- (a) the measured radionuclide concentrations and the dose coefficients laid down in Table (A) of Annex III to Council Directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation; or
- (b) more recent information recognised by the Scottish Ministers,

on the basis of an annual intake of water of 730 litres for adults.

(2) Where the following formula is satisfied, the enforcing authority may assume that the indicative dose is less than 0.1 mSv and that no further investigation is required:—

$$\sum_{i=1}^n \frac{C_i (obs)}{C_i (der)} \leq 1$$

where—

- “ $C_i (obs)$ ” refers to the observed concentration of radionuclide “ i ”;
- “ $C_i (der)$ ” refers to derived concentration of radionuclide “ i ”; and
- “ n ” refers to the number of radionuclides detected.