
SCOTTISH STATUTORY INSTRUMENTS

2015 No. 346

**The Private and Public Water Supplies (Miscellaneous
Amendments) (Scotland) Regulations 2015**

PART 2

Amendment of Private Water Supplies (Scotland) Regulations 2006

Amendment of regulation 2

3. In regulation 2(1) (interpretation) of the 2006 Regulations, after the definition of “state” insert—

““total indicative dose” means the committed effective dose for one year of ingestion resulting from all radionuclides whose presence has been detected in a supply of water intended for human consumption purposes, of natural and artificial origin, but excluding tritium, potassium-40, radon and short-lived radon decay products;”.

Insertion of regulation 5B

4. After regulation 5A (duty of relevant person in relation to disinfection)(1) of the 2006 Regulations insert—

“Application and introduction of substances and products

5B. Where a relevant person, in the preparation or distribution of a private water supply for human consumption purposes, applies any substance or product to, or introduces any substance or product into, the water which is to be supplied for those purposes, the person must take all measures necessary to ensure that, in doing so, the water supplied does not, at its point of use, contain the substance or product, or any impurity associated with the substance or product, at a concentration or value which would make the water unwholesome.”.

Amendment of regulation 21

5. In regulation 21 (monitoring duties and powers) of the 2006 Regulations—

- (a) in paragraph (1), after “Subject to” insert “paragraph (2A) and”;
- (b) in paragraph (2), after “paragraph” insert “(2A) or”; and
- (c) after paragraph (2) insert—

“(2A) The monitoring local authority must ensure that for Type A supplies (which serve premises located in the area of the authority)—

- (a) audit monitoring for—

- (i) radon (item 6C) in Table C of Schedule 1;
- (ii) total indicative dose (item 8) in that table; and
- (iii) tritium (item 10) in that table,

is carried out in accordance with Schedule 2A and that the measured values obtained are representative of the quality of the water consumed throughout the year; and

- (b) for total indicative dose (item 8) in Table C of Schedule 1—
 - (i) the method used for monitoring compliance (including screening);
 - (ii) the method used for calculating the total indicative dose; and
 - (iii) the method of analysis used (including its performance characteristics),
 are each in accordance with the relevant requirements of Schedule 5A.”.

Amendment of regulation 22

- 6. In regulation 22 (monitoring: general provision) of the 2006 Regulations—
 - (a) in paragraph (1), after “Samples” insert “required”;
 - (b) in paragraph (2), for “Samples” substitute “Subject to regulation 21(2A), samples”;
 - (c) in paragraph (4), after “Schedule 5” insert “(where applicable),”.

Amendment of regulation 24

- 7.—(1) In regulation 24(2) (monitoring: total indicative dose and tritium) of the 2006 Regulations, before sub-paragraph (a) insert—
 - “(za) not be likely to contain radon in concentrations which could exceed the concentration specified for radon (item 6C) in column (3) of Table C of Schedule 1;”.
- (2) In the cross heading for regulation 24 (monitoring: total indicative dose and tritium), after “**Monitoring:**” insert “**radon,**”.

Amendment of Schedule 1

- 8. In Schedule 1 (prescribed concentrations and values) to the 2006 Regulations—
 - (a) in Part II (national requirements) of Table B (chemical parameters), omit the entries for—
 - (i) item 3 (hydrogen ion);
 - (ii) item 6 (odour); and
 - (iii) item 9 (taste);
 - (b) in Table C (indicator parameters)—
 - (i) in the heading for column (3), after “maximum” insert “unless otherwise stated”;
 - (ii) after the entry for item 5 (colony count) insert—

“5A.	Colour	Acceptable to consumers and no abnormal change”
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- (iii) after the entry for item 6 (conductivity) insert—

“6A.	Hydrogen ion	9.5	pH value
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6B.	Odour	6.5 (minimum) Acceptable to consumers and no abnormal change	
6C.	Radon (for radioactivity)(ii)	100	Bq/l

(iv) after the entry for item 7 (sulphate) insert—

“7A.	Taste	Acceptable to consumers and no abnormal change”	
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(v) after the entry for item 10 (tritium) insert—

“10A.	Turbidity	Acceptable to consumers and no abnormal change”	
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(vi) in the entry for item 8 (total indicative dose), omit “(ii)” and “/year”; and

(vii) in the entry for item 10 (tritium), after “(for radioactivity)” insert “(iii)”; and

(c) in the notes to Table C, for note (ii) substitute—

(ii) Remedial action is to be deemed justified on radiological protection grounds, without further consideration, where radon concentrations exceed 1,000 Bq/l.

(iii) If the concentration of tritium exceeds this value, an analysis of the presence of other artificial radionuclides must be also carried out by Scottish Water.”.

Amendment of Schedule 2

9. In Schedule 2 (parameters, monitoring and sampling frequencies) of the 2006 Regulations, in Table B (audit monitoring: Type A supplies), after the row relating to item 28 (polycyclic aromatic hydrocarbons) insert—

“28A.	Radon	1	1	Y”
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Insertion of Schedule 2A

10. After Schedule 2 (parameters, monitoring and sampling frequencies) of the 2006 Regulations insert—

“SCHEDULE 2A

Regulation 21(2A)

MONITORING OF RADIOACTIVE SUBSTANCES

General principles and monitoring frequencies

1.—(1) Subject to sub-paragraphs (2) and (3), the monitoring local authority must monitor Type A supplies, which serve premises located in the area of the authority, for—

- radon (item 6C) in Table C of Schedule 1;
- total indicative dose (item 8) in that table; and
- tritium (item 10) in that table.

(2) Where the Scottish Ministers, by notice in writing to the monitoring local authority, confirm that they have established that radon, total indicative dose or, as the case may be, tritium (“the

parameter”) is not likely to be present, for a period specified in the notice, in a Type A supply (which serves premises located in the area of the authority) in concentrations which could exceed the prescribed concentration or value for that parameter, the monitoring local authority is not required to monitor the supply for the parameter during the period specified in the notice.

(3) In case of naturally occurring radionuclides—

- (a) where previous results show that the concentration of radionuclides in the supply is stable, the minimum sampling and analysis frequencies are to be decided by the Scottish Ministers, and confirmed by notice in writing to the monitoring local authority, taking into consideration the risk to human health; and
- (b) where the Scottish Ministers, by notice in writing to the monitoring local 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 total indicative dose in a Type A supply (which serves premises located in the area of the monitoring local authority) will, for a period specified in the notice, remain below the prescribed concentration or value for each parameter, the monitoring local authority is not required to monitor the supply for these parameters during the period specified in the notice.

(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.

Radon

2.—(1) Subject to paragraphs 5 and 6, the monitoring local authority must ensure that representative surveys are undertaken to determine the scale and nature of likely exposures to radon in Type A supplies (which serve premises located in the area of the authority) originating from different types of groundwater 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 monitoring local authority has reason to believe, on the basis of the results of the representative surveys or other reliable information, that the prescribed concentration or value for radon might be exceeded.

Tritium

3.—(1) Subject to paragraphs 5 and 6, the monitoring local authority must monitor Type A supplies (which serve premises located in the area of the authority) 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 prescribed concentration or value for tritium.

(2) Where monitoring for tritium is required by sub-paragraph (1), samples must be taken in accordance with regulation 23(1) (as read with regulation 22).

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

Total indicative dose

4.—(1) Subject to paragraphs 5 and 6, the monitoring local authority must monitor Type A supplies (which serve premises located in the area of the authority) for total 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 level of total indicative dose is below the prescribed concentration or 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 regulation 23(1) (as read with regulation 22).

(3) Where sub-paragraph (1) requires monitoring (of radionuclide levels) in relation to a source of elevated natural radioactivity, the Scottish Ministers must specify, by notice in writing to the monitoring local authority, the frequency of the monitoring required of—

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

for screening strategies pursuant to regulation 21(2A)(b) and Schedule 5A.

(4) Where sub-paragraph (3) applies, the frequency specified may vary from a single check measurement to the frequency which would otherwise apply under regulation 23(1).

(5) Where a single check for natural radioactivity is specified under sub-paragraph (3), the monitoring local 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 a Type A supply (which serves premises located in the area of a monitoring local authority) is treated to reduce the level of radionuclides, the monitoring local authority must monitor the supply for total indicative dose, radon and tritium in accordance with regulation 23(1) (as read with regulation 22) to verify the continued efficacy of that treatment.

Averaging

6. In circumstances where the prescribed concentration or value for total indicative dose, radon or, as the case may be, tritium is exceeded in a sample taken in relation to a Type A supply (which serves premises located in the area of a monitoring local authority), the Scottish Ministers must specify, by notice in writing to the monitoring local authority, the extent of resampling necessary to ensure that the measured values are representative of an average activity concentration for a full year.”.

Amendment of Schedule 3

11. In the table in Schedule 3 (circumstances and conditions to be considered by a monitoring local authority: decision on audit monitoring) to the 2006 Regulations—

- (a) after the entry for polycyclic aromatic hydrocarbons (item no. (26)) insert—

“(26A)	Radon	<ul style="list-style-type: none"> • The supply is located in an area which puts it at high 	<ul style="list-style-type: none"> • The monitoring local authority for the supply in question is in receipt
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		risk of exceeding the prescribed concentration or value for radon (at the point referred to in regulation 7(5)) and the supply is not open to atmospheric pressure before that point.	of a notice under regulation 24(1) which specifies, for an area in which that supply is located, that the condition in regulation 24(2)(za) is satisfied (and the notice applies to that extent)."
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- (b) in the entry for total indicative dose (item no. (33))—
 - (i) in column (3), for the words from “for” to the end, substitute “of the supply indicates that the total indicative dose is not likely to be well below the prescribed concentration or value for that parameter.”; and
 - (ii) in column (4), for the words from “If” to the end, substitute “The monitoring local authority for the supply in question is in receipt of a notice under regulation 24(1) which specifies, for an area in which that supply is located, that the condition in regulation 24(2)(a) is satisfied (and the notice applies to that extent); and
- (c) in the entry for tritium (item no. (35))—
 - (i) in column (3), for the words from “Tritium”, where it first occurs, to the end, substitute “Routine monitoring of the supply indicates that tritium is not likely to be well below the prescribed concentration or value for that parameter.”; and
 - (ii) in column (4), for the words from “If” to the end, substitute “The monitoring local authority for the supply in question is in receipt of a notice under regulation 24(1) which specifies, for an area in which that supply is located, that the condition in regulation 24(2)(b) is satisfied (and the notice applies to that extent).”.

Insertion of Schedule 5A

12. After Schedule 5 (analytical methodology) of the 2006 Regulations insert—

“SCHEDULE 5A

Regulation 21(2A)

MONITORING FOR TOTAL INDICATIVE DOSE AND ANALYTICAL PERFORMANCE CHARACTERISTICS

Monitoring for compliance with the total indicative dose

- 1.—(1) The monitoring local authority may use reliable screening strategies to indicate the presence of radioactivity in Type A supplies (which serve premises located in the area of the authority).
- (2) These strategies may include screening for—
 - (a) certain radionuclides or an individual radionuclide; or
 - (b) gross alpha activity or gross beta activity.

Screening for certain radionuclides or for an individual radionuclide

2.—(1) Where screening is carried out for certain radionuclides or for an individual radionuclide, the monitoring local 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 listed in column 2 of the table below exceeds 20% of the corresponding derived concentration in column 3; or
- (b) the tritium concentration exceeds the prescribed concentration or value for tritium.
- (2) The monitoring local 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>Derived concentrations for radioactivity in water intended for human consumption^(a)</i>		
<i>Origin</i>	<i>Radionuclide</i>	<i>Derived concentration (Bq/l)</i>
Natural	U-238 ^(b)	3.0
	U-234 ^(b)	2.8
	Ra-226	0.5
	Ra-228	0.2
	Pb-210	0.2
	Po-210	0.1
	Artificial	C-14
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

Notes

- (a) 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 radiation². Derived concentrations for other radionuclides may be calculated on the same basis.
- (b) This allows only for the radiological properties of uranium, not for its chemical toxicity.

Screening for gross alpha activity and gross beta activity

3.—(1) The monitoring local 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 a supply referred to in paragraph 1 for total 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 monitoring local authority may set alternative levels to those specified in sub-paragraph (2) if it can demonstrate that these will ensure that a total 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 monitoring local authority may assume that the total indicative dose is less than 0.1 mSv.

(5) Where sub-paragraph (4) applies, the monitoring local 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 indicative 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 monitoring local authority must carry out an analysis for specific radionuclides.

(7) The monitoring local 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 monitoring local authority must also measure the gross alpha activity and gross beta activity in that sample.

Calculation of the total indicative dose

4.—(1) The total 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⁽³⁾; 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 monitoring local authority may assume that the total 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.

Performance characteristics and methods of analysis

5. For each parameter or radionuclide listed in column 1 of the table below, the method of analysis used must be capable of measuring activity concentrations with at least the limit of detection specified for that parameter or radionuclide in column 2.

<i>Parameter / radionuclide</i>	<i>Limit of detection (in Bq/l^{(a)(b)})</i>
Tritium	10 ^(c)
Radon	10 ^(c)
gross alpha activity	0.04 ^(d)
gross beta activity	0.4 ^(d)
U-238	0.02

(3) Table (A) lays down ingestion dose coefficients for members of the public.

<i>Parameter / radionuclide</i>	<i>Limit of detection (in Bq/l^{(a)(b)})</i>
U-234	0.02
Ra-226	0.04
Ra-228	0.02 ^(e)
Pb-210	0.02
Po-210	0.01
C-14	20
Sr-90	0.4
Pu-239 / Pu-240	0.04
Am-241	0.06
Co-60	0.5
Cs-134	0.5
Cs-137	0.5
I-131	0.5

Notes—”.

- (a) The limit of detection must be calculated according to the ISO standard 11929:2010 entitled “*Determination of the characteristic limits (decision threshold, detection limit and limits of the confidence interval) for measurements of ionising radiation - Fundamentals and application*” (as it was first published), with probabilities of errors of 1st and 2nd kind of 0.05 each.
- (b) Measurement uncertainties must be calculated and reported as complete standard uncertainties, or as expanded standard uncertainties with an expansion factor of 1.96, according to the ISO IEC Guide 98-3:2008 entitled “*Guide to the expression of uncertainty in measurement*” (as it was first published).
- (c) The limit of detection for tritium and for radon is 10% of the corresponding prescribed concentration or value for the parameter.
- (d) The limit of detection for gross alpha activity and gross beta activities is 40% of the screening values of 0.1 Bq/l and 1.0 Bq/l respectively.
- (e) This limit of detection applies only to initial screening for total indicative dose for a new water source. If initial checking indicates that it is unlikely that Ra-228 exceeds 20% of the derived concentration, the limit of detection may be increased to 0.08 Bq/l for routine Ra-228 nuclide specific measurements, until a subsequent re-check is required.