
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

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	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

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 radiation¹. 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(2); 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 ^(e)
Radon	10 ^(e)
gross alpha activity	0.04 ^(d)
gross beta activity	0.4 ^(d)
U-238	0.02
U-234	0.02
Ra-226	0.04
Ra-228	0.02 ^(e)
Pb-210	0.02
Po-210	0.01

(2) 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>
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.