

European PT on radon-in-water

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**The European Commission's
science and knowledge service**
Joint Research Centre



Project Leader


Hungary
Year of EU entry: 2004
Capital city: Budapest
Total area: 93 000 km²
Population: 10 million
Currency: forint (Ft)



Viktor Jobbagy

Technical support


Belgium
Year of EU entry:
Founding member (1952)
Capital city: Brussels
Total area: 30 528 km²
Population: 10.7 million
Currency: Euro (€) since 1999



Gerd Marissens


Germany
Year of EU entry:
Founding member (1952)
Capital city: Berlin
Total area: 356 854 km²
Population: 82 million
Currency: Euro (€) since 1999



Heiko Stroh

Administrative support


Bulgaria
Year of EU entry: 2007
Capital city: Sofia
Total area: 111 002 km²
Population: 7.2 million
Currency: Lev



Petya Malo

Radioactivity in water proficiency tests

- Publication of the EURATOM Drinking Water Directive in 2013
- Since 2013: radioactivity in water PTs were not organized by JRC
- Preferences after the EURATOM Article 35-36 expert meeting in 2016:
 - radon in water,
 - gross alpha/beta activity,
 - other specific radionuclides in water (e.g. $^{210}\text{Po}/^{210}\text{Pb}$)

Radon in water PTs: pre-studies#

The major international radon in water standard methods were reviewed:

- a) ISO 13164-3:2013: Water quality - Radon-222- Part 1–3.
 - Part 1: General principles
 - Part 2: Test method using **gamma-ray spectrometry**.
 - Part 3: Test method using **emanometry**
- b) ISO 13164-4:2015: Water quality Radon-222 - Part 4.
 - Test method using two-phase **liquid scintillation counting (LSC)**.
- c) ASTM D5072-09 (2016) Standard Test Method for Radon in Drinking Water based on **LSC**.

#Viktor Jobbágy, Timotheos Altitzoglou, Petya Malo, Vesa Tanner, Mikael Hult. A brief overview on radon measurements in drinking water, Journal of Environmental Radioactivity, 2017, Vol. 173, Pages 18-24.

<https://www.sciencedirect.com/science/article/pii/S0265931X16304556>

The 2018 EC Proficiency Test in support of Article 35 Radon-222 in water

Project Leader: Viktor Jobbagy

- 2 Pilot-PT executed
- ~120 labs have expressed interest in participating (alt. have to participate) incl.: Serbia, Ukraine, Turkey, Norway,(customs problems)
- Tricky!! Measuring a gas in water
- ~~Almost~~ all errors lead to a loss of radon \Rightarrow underestimation of the activity \Rightarrow potential radioprotection issues.

PT material selection

- ✚ Natural water
- ✚ Well characterized
- ✚ Homogeneous ^{222}Rn distribution
- ✚ Target ^{222}Rn activity concentration: $> 100 \text{ Bq/L}$
 - Above the parametric value given in the E-DWD
- ✚ Very low or no ^{226}Ra activity concentration: avoiding interference from radon production during measurement
- ✚ Low in CO_2 etc.



Some rejected sources in Belgium

Sampling from one (out of two) suitable sources (not in Belgium)



Measurements, packing



Article 35/36 meeting Sept. 18-19, 2018

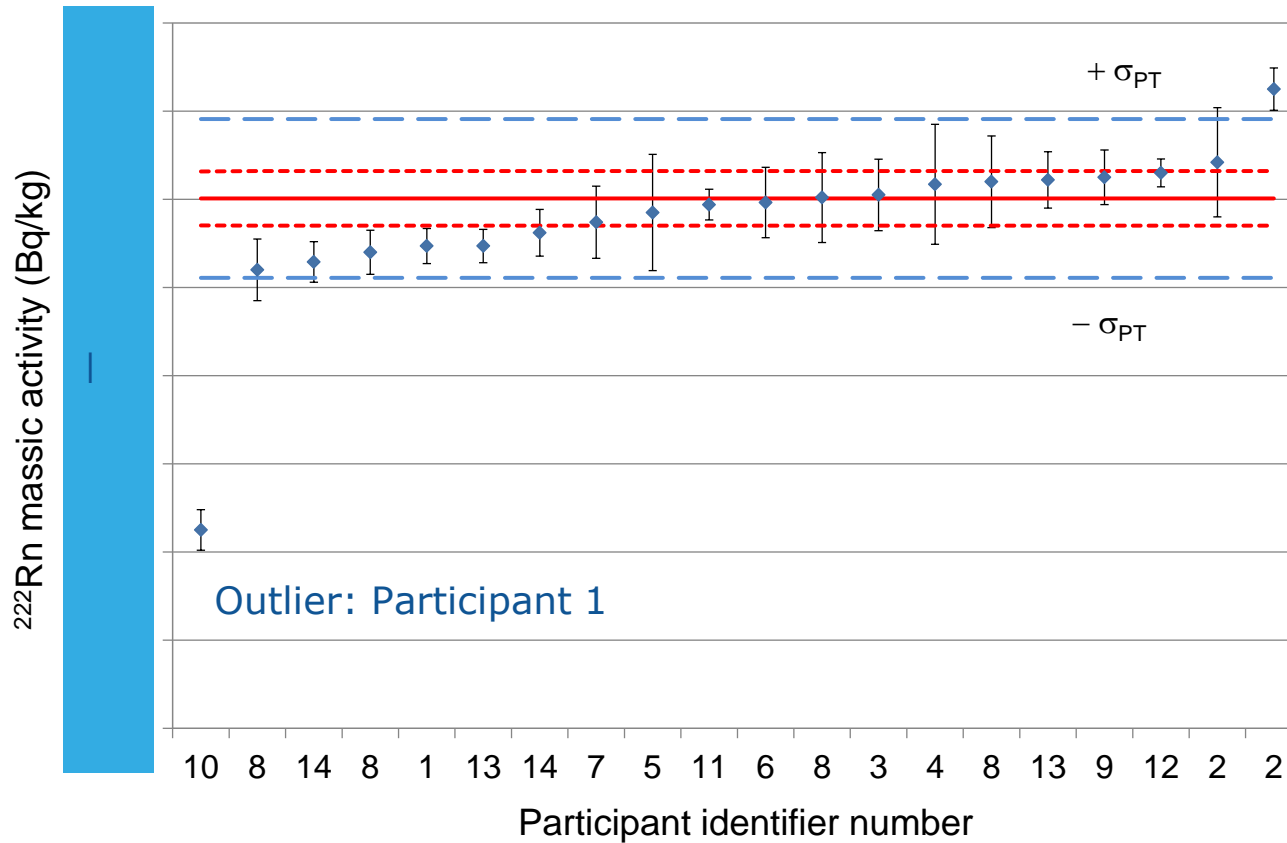


Distribution

- BOXES W COOLING ELEMENTS
- TEMPERATURE LOGGED
- RADON-TIGHT BOTTLE WITH NO AIR
- "RADIOPURE" BOTTLE



Participants` results of Pilot-PT No. 2



Radioactivity in water proficiency tests: overview

- 1) Two Radon in water pilot-PTs in 2017 (two sources)
 - Invitational basis, limited number of participants (14)
- 2) Radon in water EU-PT in 2018
 - Open PT; number of nominated/interested organizations (~ 110)
 - Status: ongoing
 - Preliminary report Dec. 2018
 - Workshop + training ~February 2019
- 3) Gross alpha/beta activity in drinking water in 2019/2020

Radon-in-water PT: Summary

- 1) State-of-the-art PT
 - providing reference value, good quality source, standardized sampling, optimized transport conditions
- 2) The best materials and transport conditions possible
- 3) Provides for excellent quality control for all participating laboratories
- 4) Follow-up workshop and training spring 2019 at JRC-Geel

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