

# Future metrology support from the Radionuclide metrology Team of JRC-Geel

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**The European Commission's  
science and knowledge service**

**Joint Research Centre**



European  
Commission

# Suggestions for future PTs

## 2019/2020:

- Gross-alpha/beta in drinking water (repetition of the 2012 exercise)
- Po-210/Pb-210 in drinking water

Separately or combined

## 2020/2021

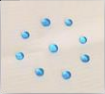






- Air-filters with Ru-106, Cs-137, Cs-134, I-131 (!!)
- Feed/food with Ru-106, .....

## FP9 (2021-2025/2027)

- Sampling and measurement of radon-in-water (???) – maybe as research
- More emergency reporting (?)
- More frequent ?
- NORM?

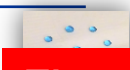
Article 35/36 Expert meeting Sept. 18-19, 2018

# Overview of EC PTs organised by JRC-IRMM (2003-2014)

Year	Matrix	Radionuclide(s)	
2003	air filter	$^{137}\text{Cs}$	
2005	milk powder	$^{40}\text{K}$ , $^{90}\text{Sr}$ , $^{137}\text{Cs}$	
2008	mineral water	$^{226/228}\text{Ra}$ , $^{234/238}\text{U}$	
2010	soil	$^{40}\text{K}$ , $^{90}\text{Sr}$ , $^{137}\text{Cs}$ , $^{212/214}\text{Bi}$ , $^{212/214}\text{Pb}$ , $^{226}\text{Ra}$ , $^{230/232}\text{Th}$ , $^{234/235/238}\text{U}$ , $^{238/239/240}\text{Pu}$	
2011	bilberry	$^{40}\text{K}$ , $^{90}\text{Sr}$ , $^{137}\text{Cs}$	
2012	drinking water	gross alpha/beta	
2014	air filter	$^{137}\text{Cs}$	

# Proficiency Tests in support of Article 35

Year	Matrix	Radionuclide(s)
2011	Bilberry	$^{90}\text{Sr}$ , $^{137}\text{Cs}$ , $^{40}\text{K}$
2012	Water	Total $\alpha$ / $\beta$ activity
2014	Air filter	$^{137}\text{Cs}$
2016	Air filter	MetroERM $^{134}\text{Cs}$ , $^{137}\text{Cs}$ , $^{131}\text{I}$
2017	Maize	$^{40}\text{K}$ $^{134}\text{Cs}$ , $^{137}\text{Cs}$ , $^{131}\text{I}$
2018	Water	Radon
2019	Water	Total $\alpha$ / $\beta$ activity and/or $^{210}\text{Pb}$ $^{210}\text{Po}$
2020	e.g. air filter	e.g. $^{134}\text{Cs}$ , $^{137}\text{Cs}$ , $^{131}\text{I}$ , $^{106}\text{Ru}$
2020	Water	Radon – Sampling!



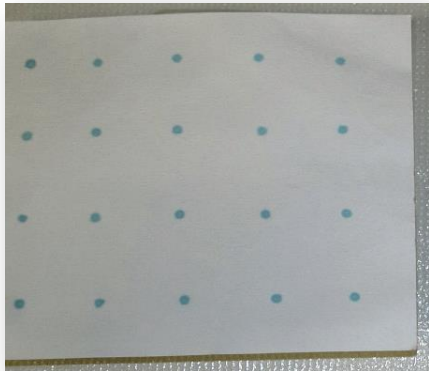
Also: First emergency exercise!

First Sampling exercise!

Preliminary / suggestions

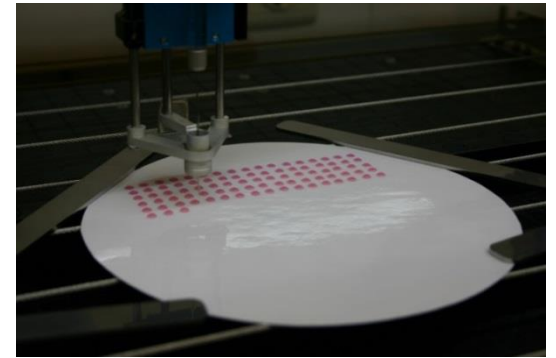
# Development in source preparation

- Precision pattern **robot dispenser** developed and tested



Old pattern (manual)

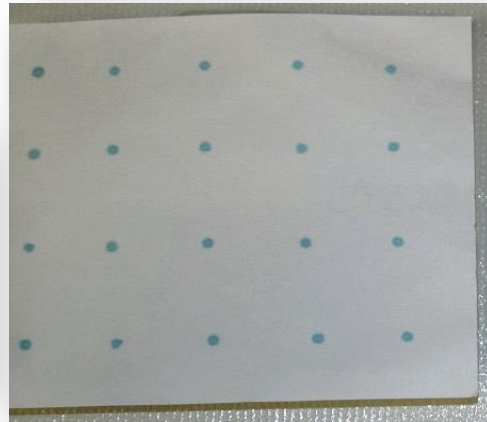
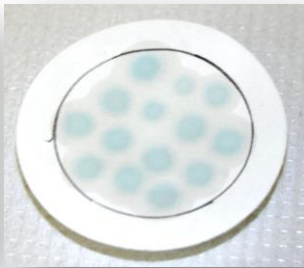
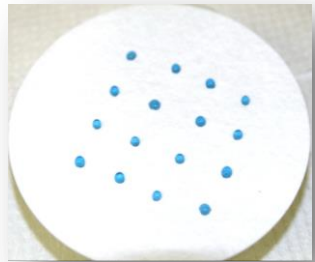
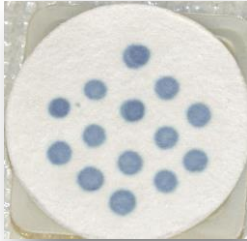
Dispenses from 20  $\mu\text{l}$  to 4 ml in various patterns and geometries



New automated pattern  
 $\Rightarrow$  quasi-homogeneous distributions possible

# Air filters spiked with $^{137}\text{Cs}$

Active spots are blue to help in folding or cutting



# CERTIFIED REFERENCE MATERIALS (CRM)

- Bilberries (on sale)
- Steel disk (soon on sale)
- Mortar
- Concrete
- .....

*Need for more reference materials:*



**Metal disks**  
with certified (low)  $^{60}\text{Co}$ -  
activity levels

*Production 2017 ✓*

*Certification 2018*

*CRM release in 2019/2020.*



# Metrological tools for nuclear decommissioning

## Calibration standards for **free release** measurements

1<sup>st</sup> application with new tubes possibly at Swedish nuclear power plants



Metal tubes  
certified activity  
 **$^{60}\text{Co}$ ,  $^{108\text{m}}\text{Ag}$**

(previously  $^{60}\text{Co}$ ,  $^{110\text{m}}\text{Ag}$ )

- *Tubes produced* ✓
- *Certification* ✓



# Production of reference materials

- Large production facility at JRC –Gel (Dir. F)
- Need for reference materials for
  - Method validation
  - Testing
  - Proficiency tests (ILCs)
  - CRMs for sale

Example: 5 (!) materials needed for the validation exercise for radioactivity in feed



# Production of **MANY** reference materials for PTs and method validation (and.. CRMs) (maize, hay, poultry feed,...)



Many thanks to  
Dir. F  
RM prod. team  
Håkan, Jean,  
John, Hanne

# CERTIFIED REFERENCE MATERIALS

*Contribution to certification of environmental materials*

**IAEA** – soil (375), milk (152), mussels (437),  
*Baltic sea sediment (465), Bikini Atoll Sediment (410), Pacific sediment (412)*

**JRC** – *bilberries (IRMM-426)*

**NIST** – shellfish (4358), Peruvian soil

**KRISS** – brown rice

**Japan** – *brown rice (JSAC), brown rice (NMIJ) (APMP.RI(II) ), Wheat flour (ongoing)*

*In green: Past 3 years*

# TRAINING

- Enabling attending ICRM, ENVIRA conferences without paper!
- Visiting underperforming labs?
- Dedicated training courses in addition to follow-up workshops

# Stay in touch



EU Science Hub: [ec.europa.eu/jrc](https://ec.europa.eu/jrc)



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