



IAEA

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F-04

## The IAEA-TEL-2011-08 National Japanese proficiency test on the determination of radionuclides in soil, grass, water and air filters

### Instructions to Participants

#### **Important - before you start to process these samples.**

- ✓ Please check the inventory of the package and compare its contents with the items listed in the “Acknowledgment of receipt of materials” form 05.
- ✓ **Sign and date the “Acknowledgment of receipt of materials”, and send it back to the Reference Materials Group by fax: (+43 1) 2600 728 226 or regular mail.**

#### 1. Measurands of interest:

Sample code	Type of sample	Approx. mass (g)	Requested measurands
01	Spiked water	500	H-3, Co-60, Ba-133, Cs-134, Cs-137, Eu-152, Am-241
02	Spiked water	500	
03	Spiked water	500	
04	Soil	150	K-40, Cs-137, U-234, U-238, Pu-238, Pu-239+240
05			
06	Grass	250	Cs-137
07			
08			
09	Simulated air filter	-	Co-57, Cs-134, Cs-137, Eu-152, Am-241
10			

The levels of the radionuclides are such that they can be measured within 6-10 hour measurement period using a conventional HPGe Gamma-spectrometer of 35% relative efficiency.

#### 2. Choice of method/procedure.

Participants may use any routine method of their choice (i.e. you should not use these samples to test a new procedure). Within bottle homogeneity is assured at 1 g for the soil sample.

#### 4. Description of the samples.

##### a. Water samples 01, 02, 03:

Matrix origin: Tap water sourced from Seibersdorf, Austria.  
The water was gravimetrically spiked with known amounts of standard solution containing a mixture of certified radionuclides and acidified with nitric acid 2% m/m. After bottling, a homogeneity test showed acceptable results.

##### b. Soil sample 04:

Matrix origin: The bulk material was collected in a farm close to Chernobyl area in Ukraine.  
More than 300 kg raw material were collected and treated in 1990 by the Reference Materials group of Seibersdorf laboratories. The material was milled in a drum mill, and then was sieved and the fraction below 150 micron was homogenised.  
The bulk material homogeneity was tested before bottling. The material was bottled and tested for homogeneity by analyzing all measurands of interest in 10 bottles at 3 replicates from each bottle. The material homogeneity was tested for sample intake 30 g for  $\gamma$  emitting nuclides and 1 g for radiochemical analysis.  
Each participant receives one bottle (150 g) of the sample. The activity levels of the radionuclides in soil sample **are relatively low**.

##### c. Grass samples 05, 06, 07:

Matrix origin: The bulk material was collected in a farm close to Chernobyl area in Ukraine.  
More than 200 kg raw material were collected and treated in 1990 by the Reference Materials group of Seibersdorf laboratories. The material was milled in a drum mill, and then was sieved and the fraction below 250 micron was homogenised.  
The bulk material homogeneity was tested before bottling. The material was bottled and tested for homogeneity by analyzing all measurands of interest in 10 bottles at 3 replicates from each bottle. The material homogeneity was tested for sample intake 30 g for  $\gamma$  emitting nuclides.

##### d. Spiked simulated air filters 08, 09, 10:

Filters preparation: The simulated spiked air filters are made of HDP material (diameter: 47 mm; thickness: 0.40 mm). The radionuclides are deposited on the simulated air filters as 19 drops on hexagonal grids. The diameter of the active deposit is 34 mm. (see Figure 1). The spiked area of the simulated filter was covered with a yellow adhesive paper to avoid any contamination; the paper thickness is approximately 0.1 mm. Please do not remove this adhesive cover and measure the filter after taking it out from the transparent plastic holder.

The PT organizer does not guarantee the assigned values and associated uncertainties of the radionuclides activities values if the filter is damaged.

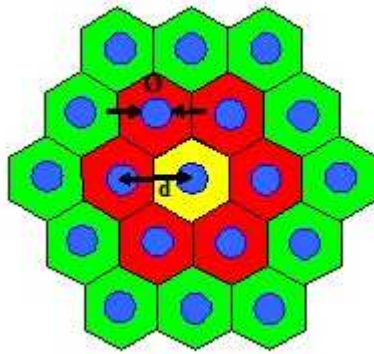


Figure 1 – Geometrical scheme of the spiking patterns. Each deposited drop is represented by a small circle,  $d = 7.4 \text{ mm}$ ,  $\text{Ø} = 4.2 \text{ mm}$ .

#### 4. Test sample handling

##### A. *Soil and grass samples:*

- ✓ Due to the possibility of materials' segregation during the shipment, please shake the bottles for 2 minutes before sub-sampling.
- ✓ Kindly let the powder of the materials to settle down before opening the bottle.
- ✓ Please take all necessary precautions when opening the sample bottle to prevent any spread of the fine powder in the laboratory.
- ✓ Determine dry-to-wet ratio of the materials by drying an aliquot (minimum 2 g) of the sample after the analysis has been performed. The recommended temperature for drying is  $105 \text{ }^\circ\text{C}$  overnight.

##### A. *Water samples:*

- ✓ Weigh the bottles and record the measured gross mass (**as received with screw-cap and labels**) on the "Acknowledgment of receipt of materials" form 05.
- ✓ Thoroughly mix the sample before transferring the contents to your standard sample counting container for  $\gamma$ -spectrometry or H-3 measurements.
- ✓ All results should be reported on a mass basis. It is recommended that the sample, or a part thereof taken for analysis, be measured by weight.

#### 5. Reporting requirements.

- ✓ Results should be reported using Reporting Forms F-01 to F-03 (see attached cover letter).
- ✓ The value of the result and its **standard combined uncertainty** must be expressed in **Bq/kg dry mass** for the soil and grass, as Bq/kg for the water sample and Bq on filter for the filters.
- ✓ All results should be decay corrected to **the reference date 15 November 2011**.
- ✓ Uncertainty should be reported as the **combined standard uncertainty (1 sigma level)** where all individual sources of uncertainty have been identified and taken into account.
- ✓ **The deadline for result reporting: 15 of April 2012.**

To:  
IAEA Environment Laboratories,  
International Atomic Energy Agency,  
Agency's Laboratories, A 2444 Seibersdorf, AUSTRIA.

## Acknowledgment of Receipt of Materials F-05

The IAEA-TEL-2011-08 National Japanese proficiency test on the determination of radionuclides in soil, grass, water and air filters

*Please sign and return this page, as soon as possible, to confirm the receipt of this package, noting any missing or damaged items at the bottom of this page.*

Your Labcode :  
Your Name :  
Institute :

This package contains the following samples:

1- Sample code 01, Spiked water	Bottle number:	*Bottle mass:.....g
2- Sample code 02, Spiked water	Bottle number:	*Bottle mass:.....g
3- Sample code 03, Spiked water	Bottle number:	*Bottle mass:.....g
4- Sample code 04, Soil	Bottle number:	
5- Sample code 05, Grass	Bottle number:	
6- Sample code 06, Grass	Bottle number:	
7- Sample code 07, Grass	Bottle number:	
8- Sample code 08, Air filter	Bottle number:	
9- Sample code 09, Air filter	Bottle number:	
10- Sample code 10, Air filter	Bottle number:	

\* Please weigh the bottles of water samples and record the measured gross mass (as received with screw-cap and label)

I acknowledge the receipt of the samples described above.

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Signature and date

The following items were missing / broken:

Please send back as soon as you receive the samples to:

**Abdulghani Shakhashiro**

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<http://nucleus.iaea.org/rpst/index.htm>