

**IAEA**

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 国际原子能机构
 International Atomic Energy Agency
 Agence internationale de l'énergie atomique
 Международное агентство по атомной энергии
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Seibersdorf, 2012/01/04

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

Dear Participant,

With reference to your participation in the IAEA-TEL-2011-08 National Japanese proficiency test on the determination of radionuclides in soil, grass, water and air filters organized by the IAEA Environment Laboratories in cooperation with School of Life and Environmental Sciences, University of Tsukuba, please read the attached instructions to participants (F-04) carefully before commencing the analysis and return the acknowledgment receipt form (F-05) to us, as soon as, you receive the samples.

In the package sent to you by the IAEA you should find 9 samples, in addition to a soil sample 04 which will be sent to you through the University of Tsukuba. The description of the samples and requested measurands for analysis in this proficiency test are presented in the following table:

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

Analysis results and estimated standard combined uncertainties must be reported using the provided reporting forms. Electronic forms in word format should be used.

In order to assess the analytical performance of the method, we would like to have information on the analytical method used in the PT. Kindly refer to the reporting form F-03 to fill the requested information.

In addition, it is important to have a short description of your method and quality control procedure applied in your laboratory. This information can be completed in the Method and Quality Control Procedure Description Form (F-03).

The deadline for result reporting is 15 of April 2012.

You are requested to print the final reporting-forms, sign on the first page and submit it by fax or e-mail as your valid results to me. _____

It is imperative that we receive the printed reporting forms (F-01, F-02) duly completed, dated and signed, as this will constitute your valid results for this exercise and will be used as the definitive source of information to confirm your results.

The participants' data will be evaluated according to the following three criteria:

A) The relative bias between the Analyst's value and the IAEA value expressed as a relative bias in percentage:

$$\text{Relative bias}(\%) = \frac{\text{Value}_{\text{Analyst}} - \text{Value}_{\text{IAEA}}}{\text{Value}_{\text{IAEA}}} \times 100$$

B) The Z-Score value calculated according to the following equation:

$$z_{\text{Score}} = \frac{\text{Value}_{\text{Analyst}} - \text{Value}_{\text{IAEA}}}{\sigma}$$

On the basis of the "fitness for purpose" principle, the target value for the standard deviation (σ) is:

$$0.10 \times \text{Value}_{\text{IAEA}}$$

The laboratory performance is evaluated as satisfactory if $|z_{\text{Score}}| \leq 2$; questionable for $2 < |z_{\text{Score}}| < 3$, and unsatisfactory for $|z_{\text{Score}}| \geq 3$.

C) The proficiency test results will be evaluated against the acceptance criteria for trueness and precision and assigned the status "Acceptable", "Warning" or "Not Acceptable" accordingly.

Trueness

The participant result is assigned "Acceptable" status for trueness if:

$$A1 \leq A2$$

where:

$$A1 = |Value_{IAEA} - Value_{Analyst}|$$

$$A2 = 2.58 \times \sqrt{u_{IAEA}^2 + u_{Analyst}^2}$$

Precision

For evaluation of precision an estimator P is calculated for each participant, according to the following formula:

$$P (\%) = \sqrt{\left(\frac{u_{IAEA}}{Value_{IAEA}}\right)^2 + \left(\frac{u_{Analyst}}{Value_{Analyst}}\right)^2} \times 100$$

P directly depends on the measurement uncertainty claimed by the participant. The Limit of Acceptable Precision (LAP) for each analyte respectively is defined for the respective proficiency test in advance, including any adjustment due to the concentration or activity level of the analytes concerned and the complexity of the analytical problem. Participants' results are scored as "acceptable" for precision when $P \leq LAP$.

In the final evaluation, both scores for trueness and precision are combined. A result must obtain an "acceptable" score in both criteria to be assigned the final score "acceptable". Obviously, if a score of "not acceptable" was obtained for both trueness and precision, the final score will also be "not acceptable". In cases where either precision or trueness is "not acceptable", a further check is applied. The reported result relative bias (R. Bias) is compared with the maximum acceptable bias (MAB). If $R. Bias \leq MAB$, the final score will be "warning". "warning" will reflect mainly two situations. The first situation will be a result with small measurement uncertainty; however its bias is still within MAB. The second situation will appear when result close to the assigned property value is reported, but the associated uncertainty is large. If $R. Bias > MAB$, the result will be "Not Acceptable".

Sincerely yours,



Abdulghani Shakhashiro

Environment Laboratories

Department of Nuclear Sciences and
Applications,

IAEA