F-02

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Seibersdorf, 22 December 2005

Proficiency Test for the Determination of ^{137}Cs and ^{210}Pb in Spiked Soil
IAEA CRP DI.50.08

Instructions to Participants

Important - *before you start the analysis*.

- Please check the inventory of the package and compare its contents with the items listed in the "Acknowledgment of receipt of materials" form.
- **Sign and date the "Acknowledgment of receipt of materials" Form-05, and list any missing or broken items (if applicable) and send this back to the IAEA Reference Materials Group by fax or post.**

1. **Analytes of interest:**
   Participants are requested to analyse the samples for ^{137}Cs and ^{210}Pb. The activity levels of the radionuclides are such that they can be measured within a 12-hour measurement period using a conventional HPGe γ-spectrometer with a 20 % relative efficiency.

2. **Kindly take all necessary precautions when opening the bottle to prevent any spread of the fine soil powder in the laboratory. Kindly homogenize the sample for 2 minutes and then let the soil powder to settle down before opening the bottle.**
3. **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). However, it is recommended to use the whole amount of material to assure good precision of measurements.

3. **Description of the samples.**

Matrix origin:	soil collected in China.
Matrix characterization:	a number of samples was pre-screened for man-made gamma-emitting radionuclides prior to spiking. The results have shown that the parent material is free from man-made radionuclides except of ^{137}Cs.
Sample preparation:	individual batches (200 g) of soil were spiked separately with known amounts of solution containing a mixture of certified gamma-emitting radionuclides and the respective holdback carriers. The samples were homogenized after spiking. Within-bottle homogeneity was checked by measuring four equal aliquots (50g) from soil sample by gamma-spectrometry. The radionuclides were found to be distributed homogeneously, the heterogeneity contribution to the uncertainty was estimated to be around1-1.5% of the target value.

4. How to handle the spiked soil sample (200 g bottles)?

- Thoroughly mix the sample before transferring the contents to your usual sample counting container. The latter should be large enough to accommodate the total amount of sample or at least a large part of it.
- Analyse the sample in the gamma-ray spectrometer for sufficient time to ensure at least 5% RSD for the least active radionuclide measured.
- Determine dry-to-wet ratio by drying an aliquot (or more) of the sample after the gamma-spectrometry analysis has been performed. The recommended temperature for drying is 105 °C for overnight.
- Save the empty sample container to enable ex-post examination in case if the measurements fail to furnish good results.

5. Reporting requirements.

- ✓ Results should be reported on the attached Reporting Form F-01.
- ✓ The value of the result and its associated uncertainty must be expressed in Bq/kg dry weight for the spiked samples and as Bq/g for the standard solution.
- ✓ All results should be decay corrected to **the reference date 2006-01-01.**
- ✓ 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 name of the person performing the analyses should be clearly indicated on the Reporting Form to distinguish the analyst from those in a supervisory role.
- ✓ After filling in the necessary information, please return the Reporting Form F-01 to us. In order to facilitate the treatment of you results you are encouraged to send us your results by e-mail. The date of submission of the e-mail will be recorded as the date of submission of your results. However, we still need to receive the hard copy since it provides us with a more detailed report which is necessary for our evaluation.
- ✓ **The deadline for submission of results is set to 20 February 2006.**