



**International Atomic Energy Agency**  
**Analytical Quality Control Services**  
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# REFERENCE SHEET

## REFERENCE MATERIAL

### IAEA-SL-2

#### RADIONUCLIDES IN LAKE SEDIMENT

Date of issue: September 1999<sup>⊕</sup>

Recommended Values  
(Based on dry weight)

*Reference Date for decay correction: 31<sup>st</sup> January 1986*

Element	Recommended Value Bq/kg	95% Confidence Interval Bq/kg	N*
<sup>40</sup> K	240	216 – 264	16
<sup>137</sup> Cs	2.4	2.1 – 2.7	13

\* Number of accepted laboratory means which were used to calculate the recommended values and confidence intervals.

⊕ Revision of the original reference sheet dated May 1987

The values listed above were established on the basis of statistically valid results submitted by laboratories which had participated in an international intercomparison exercise organized during 1986-1987. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/RL/142) "Report on the Intercomparison Run IAEA-SL-2: Radionuclides in Lake Sediment" [1]. This report is available free of charge upon request.

## **Intended Use**

This sample is intended to be used as a reference material for the measurement of  $^{40}\text{K}$  and  $^{137}\text{Cs}$  in lake sediment samples. It can also be used as a quality control material for the assessment of a laboratory's analytical work, for the validation of analytical methods and for quality assurance within a laboratory.

## **Origin and preparation of the material**

The lake sediment was collected from the Neusiedlersee, located some 80 km south-east of Vienna, Austria. The material was collected directly from the top layer of the sediment using a mud pump and then coarse particles were removed in the field by passing the sediment through a 1 cm sieve.

After removal of the superficial water, the sediment material still retained approximately 46% water by weight. The material was allowed to air dry for one month before being dried in an oven at 400 °C for 24 hours. After drying, the material was milled to pass a 500 µm sieve. This fraction was then passed through a 71 µm sieve. The portion of the material with a size fraction between 72 and 500 µm was designated SL-2 and used for an intercomparison study of radionuclides. The material was thoroughly mixed in a rotating plastic drum for 10 hours and then bottled into plastic containers each containing approximately 250 g. Finally, the samples were irradiated to a dose of  $2.5 \times 10^4$  Gy using a  $^{60}\text{Co}$  source to ensure long-term stability of the material by inhibiting microbial action.

## **Homogeneity**

The homogeneity of the material was assessed by measuring the  $^{40}\text{K}$  and  $^{137}\text{Cs}$  activity in ten bottles, chosen at random, using gamma spectrometry. Taking into consideration the activity concentrations measured for  $^{137}\text{Cs}$  and  $^{40}\text{K}$ , the material could be considered homogeneous for sample sizes of 250 g.

## **Dry weight determination**

All recommended values are expressed on a dry weight basis. Therefore the dry weight must be determined at the time of analysis, using separate sub-samples of at least 500 mg dried to constant weight in a drying oven set to 105 °C. Subsequent weighings should differ by less than 5 mg.

## **Instructions for use**

The recommended sample size for analysis is 250 g. Analysts are reminded to take appropriate precautions in order to avoid contamination of the material during handling. No special precautions are required for the storage of this material.

## **Legal disclaimer**

The IAEA makes no warranties, expressed or implied, with respect to the data contained in this reference sheet and shall not be liable for any damage that may result from the use of such data.

## **References**

- [1] LaBrecque J. J., Dekner R., Hanna A. N., Reichl F., Rassoul A. and Schelenz R., Report on the Intercomparison run IAEA-SL-2: Radionuclides in Lake Sediment. IAEA/RL/142, IAEA, Vienna, Austria 1987.

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