



INTERNATIONAL ATOMIC ENERGY AGENCY  
AGENCE INTERNATIONALE DE L'ENERGIE ATOMIQUE  
МЕЖДУНАРОДНОЕ АГЕНТСТВО ПО АТОМНОЙ ЭНЕРГИИ  
ORGANISMO INTERNACIONAL DE ENERGIA ATOMICA

INTERNATIONAL LABORATORY  
OF MARINE RADIOACTIVITY

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REFERENCE SHEET  
REFERENCE MATERIAL  
IAEA-306 MARINE SEDIMENT  
Reference date : 1 January 1988

Reference activity concentrations:

Radionuclide	Activity Bq kg <sup>-1</sup>	Confidence interval Bq kg <sup>-1</sup> ( $\alpha=0.05$ )
Potassium-40	785	757-827
Strontium-90	4.8	4.0-5.1
Antimony-125	4.9	3.9-6.0
Caesium-134	53	50-54
Caesium-137	201	194-206
Lead, Polonium-210	435	390-489
Radium-226	66	60-81
Radium-228	48	38-53
Thorium-228	50	45-54
Thorium-230	62	53-63
Thorium-232	49	47-56
Uranium-234	82	76-86
Uranium-238	77	65-95
Plutonium-238	0.17	0.14-0.19
Plutonium-239+240	5.7	5.5-6.3
Americium-241	1.8	1.6-2.1

Note : Activities are expressed on dry-weight basis

## Designation

This sample is intended as a reference material for the measurements of man-made and natural radionuclides in environmental marine sediment samples. It can also be used for checking analytical techniques and for educational purposes.

## Description of the material

The marine sediment was collected in October 1986 in the Baltic Sea. It is a mixture of surface layers of different sediment cores. The material was freeze-dried, ground, sieved and homogenized; then it was dispensed into polyethylene bottles. Moisture content determined by drying aliquots of the material at 80°C to constant weight (1-2 days) was found to be 0.9%.

## Homogeneity test

The homogeneity test was made on samples selected at random by measuring  $^{40}\text{K}$ ,  $^{134}\text{Cs}$ ,  $^{137}\text{Cs}$ ,  $^{239+240}\text{Pu}$  and  $^{241}\text{Am}$ . It was found that the results did not differ significantly and that the material could be considered as being homogeneous.

## Establishing of reference values

The reference values given in the certificate were established on the basis of results submitted by 84 laboratories participating in the world-wide intercomparison exercise organized by the IAEA-ILMR during the period 1988-1989. They represent overall median values calculated from the results that have passed the statistical tests for outliers. The confidence intervals were calculated using statistical tables for distribution-free sample population and represent symmetrical two-sided intervals at a significance level of 0.05. A number of quality criteria were demanded in order for the values to be recommended.

More details concerning the intercomparison sample IAEA-306 can be found in the Report "Intercomparison of radionuclide measurements in marine sediment sample IAEA-306", Report No.40, International Laboratory of Marine Radioactivity, IAEA, Monaco, October 1989. This report is available upon request.

Note : These reference values are the best estimates of the true activity concentrations available at present. They may undergo future revisions as new data become available. The users of this reference material are therefore kindly invited to report any meaningful results that may help improve any resulting re-evaluation.

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