

Background

The low-level radioactivity measurements service performs measurements of alpha or beta emitters on various types of low-radioactivity samples (biological and environmental) from internal and external clients.

Objectives

- to maintain and develop techniques concerning the measurement of low-level radioactivity of alpha and beta emitting radionuclides in environmental or biological samples;
- to measure these samples by means of low-background counters (liquid scintillators, proportional counters, ZnS counters and alpha-spectrometers);
- to support and advise the nuclear and non-nuclear industry on problems of radioactive contamination or low level radioactivity measurements;
- to maintain the quality assurance (QA) system according to the ISO17025 standard for which we obtained the Beltest accreditation in 1998;
- to assess the internal dose from occupational intakes of radionuclides for workers of the nuclear industry;

Programme

Our service proposed is low level radioactivity measurements of:

- total alpha and beta activity with proportional and ZnS counters;
- ^3H , ^{14}C and other low energy beta emitters by liquid scintillation;
- ^{90}Sr , ^{89}Sr and ^{131}I activity measurements with proportional counters;
- ^{226}Ra and ^{222}Rn by the emanation method;
- uranium by KPA (Kinetic Phosphorescence Analysis);
- polonium, thorium, uranium, plutonium, americium and curium by alpha spectrometry;

Principal results

In 2006, the Low-level Radioactivity laboratories have measured more than 9800 samples, yielding more than 12500 results. These services were provided for 75 % to SCK•CEN and 25 % to external clients.

Our laboratories analysed 1790 biological samples (1598 urine, 158 nose-blow and 34 faeces). These analyses were requested for 83% by Health Physics departments of external clients for the control of workers handling radioactive materials. The main elements measured in these samples are plutonium, uranium, americium and tritium. Radium and americium measurements were also performed to monitor people who accidentally manipulated these radioactive materials in public waste disposal places. Three persons were also monitored for ^{210}Po . These were two Belgian passengers of British Airways planes contaminated with polonium and one other who stayed at the Millennium Hotel in London. The level of ^{210}Po activity found in their urine was consistent with a natural excretion.

Within the frame work of radiological survey of nuclear installations, our laboratories have measured numerous environmental samples. Daily airborne dust samples collected on SCK•CEN's site at Mol were measured for total alpha and beta activities. For 2006, the average total alpha and beta activity in air borne dust was 1.8 and 15 mBq/m³ respectively compare to 0.65 and 13 mBq/m³ observed in 2005. The higher level of alpha activity in airborne dust observed in 2006, is due to an accidental release from the stack of alpha activity in October 2006. An alpha activity of 5.6 and 8.6 mBq/m³ was measured on the air filter collected on 15 and 16 October. This activity was for 32% due to plutonium isotopes and for 68% to ^{241}Am .



The average total alpha and beta activity of rain water was 13 and 110 mBq/l respectively. The results obtained in 2006 are not significantly different from those measured previously. Our laboratories measured environmental samples collected at or around SCK-CEN or nuclear facilities such as Doel, for alpha and beta global activity and for tritium, ^{90}Sr , ^{131}I , ^{226}Ra , uranium, plutonium and americium. These samples consisted of surface water, soil, sediment, fish and milk.

Future developments

The airborne dust and rainwater sample collection will be extended to another point for measurement of global alpha and beta activity.

Main contact person

E-mail: churtgen@sckcen.be

Web: <http://www.sckcen.be/lrm>