Progress on the NMi-standards for radioactivity measurements

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Since the summer of 2005 the standards of NMi Van Swinden Laboratory are situated in Delft. All measuring instruments have been set-up again and are operating well. We had a specialist from another lab, to look at the quality system we have for our facilities. We also had a visit from the Dutch authority to look at the licence we have for our closed and open sources. All was found to be in accordance with the quality system and the licence we have.
To establish traceability in the field of radioactivity measurements, NMi is still developing a primary standard for radioactivity measurements. At this moment the highest standard is the well type ionisation chamber, traceable to NPL.
We calibrate sources for the calibration of contamination monitors, as well as contamination monitors themselves, for some common β-ray emitting nuclides (^{14}C, ^{36}Cl, ^{137}Cs , ^{99}Tc and ^{90}Sr/^{90}Y) and for an α–emitter (^{241}Am).
For some nuclides (^{18}F, ^{123}I), the activity is measured and reported to the customer. For a few other nuclides (^{57}Co, ^{133}Ba, ^{134}Cs, ^{137}Cs, ^{54}Mn, ^{60}Co, ^{125}I and ^{192}Ir) the response of the dose calibrator is compared with the current from the well chamber of NMi.

Well-type ionisation chamber

The instrument is calibrated at NPL. To prevent sources used at other measuring systems in the same room to have an effect on the response of the well type ionisation chamber, the system has been built into a lead castle. The current from a check source (^{226}Ra) is measured once every month. The current from this source has been shown to vary with the season, probably due to the capacitor.

Gamma-ray spectrometer

The gamma ray spectrometer has a horizontal source-detector geometry, to be able to measure liquid-filled ampoules.
The sources measured with this system can be placed at seven different distances from the detector, source-detector distances ranging from about 90 cm to about 10 cm. These source-detector distances represent about a factor of one hundred difference in the count rate of the detector.

Windowless proportional counter

The third detection system is a windowless proportional counting system. This system has also been built into a lead castle. Measurements have been made for the Slovenian standards institute for five of their sources.
This standard requires an intercomparison.

Development of a primary standard

A start was made with the development of a primary standard for radioactivity measurements. The system will be ready at the end of 2007. From that time NMi will take part in comparisons of the International Reference System SIR

As mentioned earlier, the system will be a β/γ coincidence system. A start has been made using the LSC as a β-detector. The system will at first be used as a detector for beta-emitters. We will have a system using the CIEMAT/NIST method to evaluate the activity of beta-emitters.

We placed two NaI-detectors inside the lead castle and will be measuring beta-gamma emitters by coincidence measurements.

Accreditation

NMi was accredited in 2001 for not only the dosimetric services, but also for measurement of radioactivity and the calibration of contamination monitors. At the end of 2005 there was a visit of a specialist, resulting in a new accreditation of the radioactivity measurements and the dosimetric measurements.