Progress on the NMi-standards for radioactivity measurements

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The standards of NMi Van Swinden Laboratory have been moved from Utrecht to the headquarters from NMi in Delft. At this moment (end of April 2005) all measuring instruments are being setup again and we hope they will be ready by the end of May. We have a specialist from another lab coming to look at the quality system we have for our facilities.
To establish traceability in the field of radioactivity measurements, NMi is developing a primary standard for radioactivity measurements. At this moment the highest standard is still the well type ionisation chamber, traceable to NPL.
We calibrate contamination monitors for some common β-ray emitting nuclides (^{14}C, ^{36}Cl and ^{90}Sr/^{90}Y) and for an α–emitter (^{241}Am).
Furthermore the calibration of dose calibrators has been started. For a few nuclides (^{57}Co, ^{133}Ba, ^{134}Cs, ^{137}Cs, ^{54}Mn, ^{60}Co) 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.
Several measurements have been made on ^{18}F, to determine the activity concentration of a sample from a disitributor of the nuclide.

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 two difference in the count rate of the detector. The system has been calibrated for six different nuclides (^{54}Mn, ^{57}Co, ^{60}Co, ^{133}Ba, ^{134}Cs and ^{137}Cs) for liquid-filled ampoules.
From a company we have had some samples of a ^{81}Rb/^{81m}Kr-generator for activity determination. Since the sample contained a lot of ^{82m}Rb we decided to measure the samples with the help of our HPGe detector.

Windowless proportional counter

The third detection system is a windowless proportional counting system. This system has also been built into a lead castle.
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 expectation is that the detection system would be ready in 2004 was wrong and the new expectation time for this primary standard is 2006. 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.

Accreditation
NMi was accredited in 2001 for not only the dosimetric services, but also for measurement of radioactivity and the calibration of contamination monitors. In 2003 there was a visit of a specialist, resulting in a new accreditation of the radioactivity measurements and the dosimetric measurements.