

Developments of the NMI-standards for radioactivity measurements

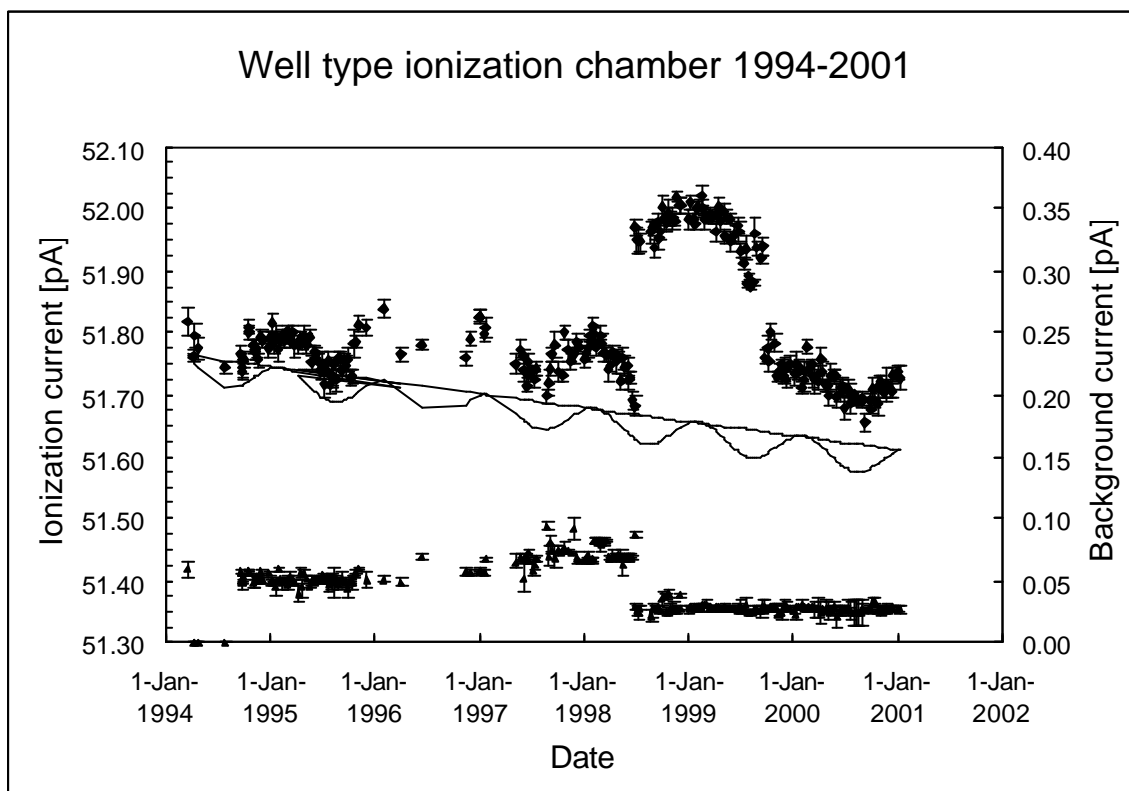
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To establish traceability in the field of radioactivity measurements, NMI intends to develop a primary standard for radioactivity measurements. The development of this primary standard will offer the possibility for NMI to take part in the International Reference System SIR.

At the moment the highest standard is a well type ionisation chamber, traceable to NPL.

Well-type ionisation chamber

The instrument is calibrated at NPL. The system has been built into a lead castle last year. The inside of the lead castle has been covered with copper and tin, both sheets 2 mm thick. Since the ionisation current was higher when the lead castle contained the copper and the tin those two materials have been removed from the lead castle.



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. The source-detector distances each represent about a factor of two in the count rate of the detector. The system has been calibrated for three nuclides (^{57}Co , ^{137}Cs and ^{60}Co) for liquid-filled ampoules. At this moment the system is being calibrated for three other nuclides (^{133}Ba , ^{134}Cs and ^{54}Mn), also for liquid filled ampoules.

The system will be calibrated for other geometries also.

Windowless proportional counter

The third detection system is a windowless proportional counting system. This system has also been built into a lead castle.

The instrument is used as the highest standard for determination of emission rates of large area sources (α - and β -ray emitting sources) used for the calibration of contamination monitors. A draft will be made in the coming months for a EUROMET project to compare this standard with those of other laboratories.

Future developments

The development of a primary standard for radioactivity measurements is planned for the coming years.