

## Progress Report on Radioactivity at the VNIIM

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### Introduction

This is a short overview of the D.I. Mendeleev Institute for Metrology (VNIIM) activities in the field of radioactivity measurements for the last 2 years. The main directions of the activities are the improvement of national primary standards, calibration and verification of measuring instruments, approval of measuring instruments type, and development of the quality management system regulations. International cooperation results are also presented.

### National primary standards development

The program of development of the standardization methods and equipment of the national primary standard in the field of radioactivity measurements has been defined. The expected program funding period is from 2012 to 2016. The program includes upgrade and modernization procedures of the existing absolute method standard measuring instruments. This will include the counting and coincidence method instruments. According to the program two new instruments will be incorporated into the national standard, namely an instrument implementing the TDCR method and an instrument implementing the  $4\pi\text{-}\gamma$  counting method. The first program phase was completed in 2012. The first phase included the upgrade of the  $4\pi\text{-}\beta$  method activity standard measuring instrument and the large area sources  $4\pi\text{-}\beta$  emission-rate method standard measuring instrument. It is planned to create a new instrument for the TDCR method implementation in 2013.

The radium mass standard (Henigshmidt sample #5427) safety provisioning system has been completed. The safety provisioning system monitors the integrity of the ampoule containing the radium mass standard (Henigshmidt sample #5427). The monitoring is implemented by continuous sampling of the radon leakage activity from the ampoule and alarm signaling in the case if it exceeds the preselected normal threshold.

### International activities

Participation in:

- International comparison of Activity Measurements of a Solution of  $^{99}\text{Tc}$ -CCRI(II)-k2.Tc-99;
- Supplement comparison on the determination of radionuclide content in a matrix of rice – CCRI(II)-S9;
- Supplement Large Area Sources Comparison Exercise – (ICRM-CCRI(II)-S10\_LASCE).

### Life science

There is an active state program of medicine development for the 2010-2020 period in the Russian Federation. The program supports the creation of regional radio-medicine clusters in Russia. Such clusters should contain radio-medicine production, and support the local clinical utilization of radio-pharmaceuticals for diagnostics purposes. Current Russian national legislation requires a regular verification of medical measuring instruments, including dose calibrators. One of the problems encountered by the calibrating laboratories is the problem of remote calibration of the built-in dose calibrators of the radiopharmacy automated production lines. Currently VNIIM is developing procedures for calibration of the built-in dose calibrators in collaboration with the diagnostic services. The goal of this work is to establish metrological traceability of radionuclide activity measurements in radio-pharmaceuticals production.

**Other activities**

Comparison of several testing and calibration laboratories was performed in three phases from 2008 to 2011. The participating laboratories perform radionuclide activity measurements of technological and environmental samples for product certification and environmental radio-monitoring. More than 50 laboratories, belonging to different companies and services in different parts of Russia, took part in the comparisons. Several specially prepared samples were used as traveling measurement standards. The goal was to ensure the laboratories' compliance with ISO 17025 requirements. In these comparisons VNIIM supplied the participants with the standard dilution samples, metrologically traceable to the key comparisons' results. The accomplished comparisons provided the MRA principles expansion to the level of testing laboratories.

**Prospects**

VNIIM will take part in the International comparison of Activity Measurements of a Solution of Tc-99m. The TDCR method will be implemented in as a part of the radionuclide activity standard.

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