

BUREAU INTERNATIONAL DES POIDS ET MESURES
Comité Consultatif pour les Rayonnements Ionisants
Section III (Neutron Measurements)
25th Meeting (Wednesday 5 June & Thursday 6 June 2019)

Venue: BIPM, Sèvres

Chair	Dr Vincent Gressier (IRSN)
CCRI President	Dr Wynand Louw (NMISA)
CCRI Executive Secretary	Dr Steven Judge (BIPM)

Delegates

Dr John-Paul Archambault (NRC)
Mr Pavol Blahušiak (SMU)
Dr Alberto Boso (NPL)
Dr Maynard Dewey (NIST)
Mr Sibusiso Jozela (NMISA)
Dr Jungho Kim (KRISS)
Dr Wei Li (CIAE)
Prof. Yuntao Liu (CIAE)
Mr José María Los Arcos (CIEMAT)
Dr Peane Maleka (iThemba Laboratory)
Dr Tetsuro Matsumoto (NMIJ/AIST)
Dr Roberto Méndez Villafaña (CIEMAT)
Dr Pieter Mumm (NIST)
Dr Walsan Wagner Pereira (LNMRI/IRD)
Dr Desiree Radeck (PTB)
Mr Neil Roberts (NPL)
Dr Zdenek Vykydal (CMI)
Dr Hui Zhang (NIM)
Dr Andreas Zimbal (PTB)

BIPM staff

Dr Susanne Picard

Dr Sten Bergstrand

Minutes

1. Welcome by the President of the CCRI, Dr Wynand Louw (NMISA) and the Chair of CCRI Section III, Dr Vincent Gressier (IRSN)

Wynand Louw and Vincent Gressier welcomed delegates to the meeting.

Wynand Louw reported that Regional Metrology Organizations (RMO) are moving forward and reshaping. Proposals to cover Calibration and Measurement Capabilities (CMCs) were put forward at the meeting of the RMO Working Group on June 3rd, to be presented to the CCRI on Friday; CCRI(III) should therefore confirm that the CMCs cover our needs before the proposal is submitted.

Vincent Gressier asked Wynand Louw about the number of laboratories in a country that can submit results to the KCRV. Wynand Louw confirmed that only one lab (the NMI) can submit results to the KCRV, but a second lab can submit results to a comparison report.

2. Appointment of the Rapporteur

John Paul Archambault (NRC) was appointed rapporteur.

3. Changes to the agenda

There were no changes to the agenda.

4. Report from the Key Comparison Working Group (III)

- a. On-going Comparisons
 - i. CCRI(III).K9.AmBe.1 – only NPL and NIM have submitted results

- ii. CCRI(III).K9.AmBe.2 – only NPL and LNHB have submitted results, it is unclear whether ENEA will submit a result
 - iii. CCRI(III).K9.Cf.2016 – there have been some delays due to transferring source across borders, but otherwise on track. Draft A scheduled for next CCRI meeting (depending on how long it takes participants to submit results). A reminder that reports should be submitted by participants to Steven Judge of BIPM.
 - ENEA confirmed that they will remain a participant in the comparison
 - iv. CCRI(III).S1-H*(10) – currently in the middle of the schedule, with SCK and IRSN moved to the end. All but four of participants that have had the instruments have submitted reports. The plan is to have the results by next CCRI meeting (depending on how long it takes participants to submit results).
 - ENEA cancelled their participation before the beginning of the comparison but will discuss this internally and will send an email to the pilot (Désirée Radeck, PTB) if they can participate now and receive instruments at the end of the schedule
 - v. CCRI(III).S2-H_p(10) – a proposal was put forward to reduce irradiation times. Jungho Kim had carried out a study to parameterize the uncertainty on the reading of as a function of the dose. In addition, a linear fit of the dose as a function of time could lead to a calibration factor. Andreas Zimbal questioned the correlation of data in the latter measurements. It was concluded that Jungho will complete the Technical Protocol and this will be discussed based on the document and the suggested procedure.
 - vi. CCRI(III)-K8 Thermal neutron fields – IRSN will pilot the comparison (the contact is Veronique Lacoste). It is planned to have a protocol defined and approved by the end of 2019. A questionnaire will be sent on specifications of the reference neutron field and feasibility of participation in the comparison with either transfer instruments or gold foil activation. A He-3 transfer instrument is intended to be used.
- b. Planned comparisons and pilot studies
- i. There was a discussion on the interest in a pilot study about gold foil activation in parallel with CCRI(III)-K8. It is proposed to distribute a questionnaire to gather information (size, thickness of gold foils, range of activity to measure, etc). Some delegates expressed concern about the difficulty of transporting activated foils across borders. IRSN or NPL were identified as possible pilot labs.
 - ii. A comparison of the measurement of fluence for mono-energetic neutron fields was also proposed. Participants could include NIST(to be confirmed), CMI, VNIIM, NPL, NMIJ, KRISS (to be confirmed), PTB and IRSN. The neutron energies may be 0.25, 2.5, 5, 14 and/or 19 MeV (participants may choose at which energies to measure the fluence). PTB agreed to pilot the comparison and IRSN agreed to loan a long counter. One possibility for laboratories who don't have access to mono-energetic fields but have measurement capabilities would be to go to PTB to perform measurements in a parallel study. The technical protocol is planned to be circulated before the end of the year to start the comparison at

the beginning of 2020.

5. RMO Comparisons

The RMOs have no planned comparisons.

6. Future needs for comparisons (RMO, key, or supplementary comparisons)

- a. High-energy neutrons. There are very few facilities available worldwide at present for high-energy neutron metrology (listed below). It was agreed that there would be further discussion about the need for comparisons in this field in 2021.

Lab	Neutron Energy [MeV]
NMIJ	40-60
CIAE	70-100
iThemba Labs	30-200

7. Exchange of information on neutron metrology in progress, Part 1.

Presentations were given by CIEMAT, PTB, KRISS, LNMRI-IRD, NMIJ, NMISA and iThemba Laboratories. Copies of the presentations, where available, are available in the working documents section for this meeting of the BIPM website.

8. Strategic plan 2018-2028

Steven Judge (BIPM) gave a presentation on the new CCRI Strategic Plan and asked for feedback before the strategy is published (a workshop to capture feedback was scheduled for later that week). The main sections of the document are: Executive Summary, Challenges in field, Vision and Mission, Aims and Activities. The final document will be published on the BIPM website.

Two topics were noted to be added to the strategy:

- support for fundamental science in collaboration with academia
- extended range (both lower and higher) for neutron energy and intensities

The main conclusions are also summarized in the presentation to be given to the Strategy Working Group meeting (CCRI(III)/19-13).

9. The International Fusion Materials Irradiation Facility – Demo Oriented Neutron Source (IFMIF-DONES)

José María Los Arcos (CIEMAT) gave a presentation co-authored by Angel Ibarra Sanchez on the IFMIF-DONES facility.

Andreas Zimbal remarked that it is necessary to have increased communication between the fusion community and the neutron metrology community, and that José María is in the perfect position to make that happen given his previous role at the BIPM.

José María will provide a document to Section III on the neutron metrology needs and the technical specifications of IFMIF-DONES.

10. CIPM MRA Part 2

- a. RMO Activities
Not discussed at the meeting as this had been covered in a separate meeting.
- b. BIPM-KCDB Update (Susanne Picard)
 - i. The principles and rules remain the same, but interface will change
 - ii. The target date for launch is October 2019
- c. JCRB Update – Sten Bergstrand
 - i. One issue identified by the JCRB was that CMCs were being submitted without evidence to support the Quality Management System
 - ii. The key message was: JCRB is there to help, so ask!
- d. New format for CMCs

The new format for CMCs proposed by EURAMET was discussed.

- i. The consensus was that the following service categories should be used:

Quantity	Material	Source
Emission rate	Air	High Energy (>20MeV)
Fluence/rate	Water	Mono-energetic
Absorbed Dose	Tissue	Thermal neutrons
	Not Applicable	Wide energy range neutrons
		Radionuclide sources

Absorbed dose was retained on recommendation of NIM and VNIIM. Ambient and personal dose equivalent rate were removed as they are derived quantities. Existing CMCs can be reconfigured under fluence (rate) or emission rate.

11. Exchange of information on neutron metrology in progress, Part 2

Presentations were given by the NPL, VNIIM, NRC, CIAE, NIM, CMI, NIST, IRSN and SMU. Copies of the presentations, where available, are available in the working documents section for this meeting of the BIPM website.

No presentations were given by institutional stakeholders.

12. Membership of CCRI Section III

A request had been received from an Egyptian laboratory to join CCRI Section III, but no representative was present at meeting, so the discussion could not go ahead.

13. CCRI(III) Working document status

Nothing to report.

14. Bibliography

Nothing to report.

15. Other publications

Nothing to report

16. Any other business

Nothing to report.

17. Date of the next meeting

The next meeting will be held at the BIPM in 2021.