

BUREAU INTERNATIONAL DES POIDS ET MESURES
Comité Consultatif pour les Rayonnements Ionisants
Key Comparison Working Group III (Neutron Measurements)

Tuesday 4th June 2019

Venue: BIPM, Sèvres

Chair Dr Vincent Gressier (IRSN)

Executive Secretary Dr Steven Judge (BIPM)

Delegates

Dr John-Paul Archambault (NRC)

Dr Alberto Boso (NPL)

Dr Maynard Dewey (NIST)

Dr Jungho Kim (KRISS)

Dr Wei Li (CIAE)

Prof. Yuntao Liu (CIAE)

Dr Peane Maleka (iThemba Laboratory)

Dr Tetsuro Matsumoto (NMIJ/AIST)

Dr Roberto Méndez Villafaña (CIEMAT)

Dr Liviu-Cristian Mihailescu (SCK•CEN)

Mr Nikolay Moiseev (VNIIM)

Dr Pieter Mumm (NIST)

Dr Walsan Wagner Pereira (LNMRI/IRD)

Dr Desiree Radeck (PTB)

Dr Cheick Thiam (LNE-LNHB)

Dr Zdenek Vykydal (CMI)

Dr Hui Zhang (NIM)

Prof. Jian Zhang (NIM)

Dr Andreas Zimbal (PTB)

1 Welcome

Vincent Gressier (CCRI(III) chair) welcomed delegates to the meeting.

2 Appointment of Rapporteur:

Désirée Radeck (PTB) was appointed *rapporteur*.

3. Changes or additions to the agenda

There were no changes to the agenda.

4. Report on CCRI(III)-K9.AmBe.2: Neutron emission rate

The pilot laboratory is the NPL. Neil Roberts (NPL) could not attend the meeting. Alberto Bosso (NPL) presented the present status of the comparison. The Draft A of the report cannot be completed because the ENEA results have not been supplied yet. Vincent Gressier told the KCWG that the ENEA has withdrawn all their CMC entries but that he did not have any information on their participation in the comparisons for which they were registered. (Note: At the later CCRI(III) meeting, Marco Capogni (ENEA) stated that the ENEA would send the results within one month.)

5. Report on CCRI(III)-K9.Cf: Neutron emission rate

The pilot laboratory is the NPL. Alberto Bosso (NPL) also presented the present status of the comparison. The comparison will be finished within the next 12 months. The participation of the ENEA in this exercise was also unclear (Note: Marco Capogni (ENEA) confirmed at the later CCRI(III) meeting that the ENEA plans to participate.) Only CMI reported they had sent their results to the BIPM.

6. Report on CCRI(III)-S1: Ambient dose equivalent

The pilot laboratory is the PTB. Désirée Radeck (PTB) reported on the status. The comparison is on-going and measurements are on schedule. Seven of fifteen participants have performed their measurements. Participants were supposed to determine the calibration factor for every source at site or at least for the sources for which they held CMC entries. Results will be obtained for Cf, Cf(mod.), and Am-Be. For Am-Li, Am-F, Pu-Be there might be informal results as there are too few participants to merit a report in the KCDB. The reports of some participants are behind schedule.

The NMISA reported a change of the contact person.

The KRISS reported malfunctions of one of the instruments in May 2019. The initialization of the SD card is sometimes not working properly. It works after restart. Also, the instrument fails in counter mode. The PTB contacted the manufacturer. They stated that a firmware update is needed that would take about one week and that other functions are not affected. The KCWG(III) agreed to continue the comparison without the update since the measurements in timer mode for the comparison are not influenced by the malfunction.

7. Status of CCRI(III)-S2: Personal dose equivalent

The KRISS will be the pilot laboratory for this supplementary comparison. Jungho Kim (KRISS) reports on the status of this planned comparison. The technical protocol is still in preparation. A first draft will be circulated in early July. The start of the comparison is planned for the beginning of 2020.

Several issues were discussed:

- the dose value for the comparison
- the number of transfer instruments (2 Fuji + 2 MGP or fewer?)
- the number of sources
- the method to correct for in-scattered neutrons

The KCWG(III) agreed as follows:

- The dose value will be 10 mSv in order to reduce the statistical uncertainty and to ensure it is possible to use the results to learn about the influences of quantities and performance of procedures.
- All sources available should be used.
- All four electronic personal dosimeters will be circulated. In case of time constraints the participant should reduce the number of transfer instruments irradiated or the number of sources.
- The participants should use their routine procedure to treat the influence of in-scattered neutrons. The report should contain a detailed description of the method, or report if it is not taken into account.

8. Status of CCRI(III)-K8.2018 Thermal neutron fluence rate

Vincent Gressier asked delegates if their laboratory would be interested in taking on the role of pilot laboratory. In the end, it was agreed that Véronique Lacoste (IRSN) will pilot the comparison. A draft of the technical protocol is planned before the end of 2019. The comparison is intended to run from 2020 to 2022.

Several issues for the comparison plan were discussed:

- Which transfer instruments should be used? Same as for K8? Or gold foil activation? Or a combination?
- Comparison on neutron fluence rate? Or on dose equivalent?

The KCWG(III) agreed to:

- provide a questionnaire on specifications of the reference neutron field and feasibility of participation in the comparison with either transfer instruments or gold foil activation
 - conduct a comparison only in terms of neutron fluence rate (key comparison)
 - include an option to split the comparison into two parts: 1) He-3 counter transfer instrument, piloted by the IRSN to start as soon as possible, 2) gold-foil activation.
- The proposal was to be discussed again in the CCRI(III) meeting.

9. New comparisons

a. Mono-energetic neutron fields

The PTB offered to pilot the comparison. The energies proposed were 250 keV, 2.5 MeV, 5 MeV, and 19 MeV. The energies should be chosen in such way that every lab interested can participate. The proposed procedure is to circulate a transfer instrument. The proposed transfer instrument is the IRSN Long Counter (He-3, so there should be fewer transport problems). Laboratories without access to their own mono-energetic neutron fields can participate in a satellite comparison at the PTB. Further discussions and a decision on the procedure were to take place at the CCRI(III) meeting.

b. Other proposals

A comparison for high-energy neutron fields is foreseen for the future. The topic was to be discussed further at the CCRI(III) meeting.

10. Any other business

There were no further items to discuss and the meeting was closed.

11. Date of next meeting

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