Bureau International des Poids et Mesures

Consultative Committee for Ionizing Radiation (CCRI)

Report of the 27th meeting
7 June 2019
to the International Committee for Weights and Measures

Comité international des poids et mesures

LIST OF MEMBERS OF THE CONSULTATIVE COMMITTEE FOR IONIZING RADIATION as of 7 JUNE 2019

President

Dr W. Louw, National Metrology Institute of South Africa [NMISA], Pretoria

Executive Secretary

Dr S. Judge, International Bureau of Weights and Measures [BIPM], Sèvres

Members

Laboratoire National de Métrologie et d'Essais [LNE (represented by LNE-LNHB/CEA and LNE-IRSN)]
Federal Agency on Technical Regulating and Metrology [Rosstandart], Moscow
Korea Research Institute of Standards and Science [KRISS], Daejeon
National Institute of Metrology [NIM], Beijing
National Institute of Standards and Technology [NIST], Gaithersburg
National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba
National Physical Laboratory [NPL], Teddington
Physikalisch-Technische Bundesanstalt [PTB], Braunschweig

Official observers

Bundesamt für Eich- und Vermessungswesen [BEV], Vienna
Central Office of Measures/Gtówny Urgad Miar [GUM], Warsaw
Centro Español de Metrología [CEM], Madrid
Czech Metrology Institute [CMI], Brno
Federal Institute of Metrology METAS [METAS], Bern-Wabern
Government Office of the Capital City Budapest [BFKH], Budapest
Instituto Nacional de Metrologia, Qualidade e Tecnologia [INMETRO], Rio de Janeiro
Institutul National de Metrologie [INM], Bucharest
Istituto Nazionale di Ricerca Metrologica [INRIM], Turin
National Measurement Institute, Australia [NMIA], Lindfield
National Metrology Institute of South Africa [NMISA], Pretoria
National Research Council of Canada [NRC], Ottawa
Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava
Nederlands Meetinstituut Van Swinden Laboratoriun [Nmi-VSL], Delft

Liaisons

European Commission - Joint Research Centre [JRC-Geel], Geel
International Atomic Energy Agency [IAEA], Vienna
International Commission on Radiation Units and Measurements [ICRU]

1– 4 INTRODUCTIONS / RAPPORTEUR / REPORT OF PREVIOUS MEETING

The 27th meeting of the Consultative Committee for Ionizing Radiation (CCRI) was held at the BIPM in Sèvres on 7 June 2019.

The following were present:
J. Adams (NIST), U. Ankerhold (PTB), I. Aunineau-Laniece (LNE-LNHB), M. Embid Segura (CIEMAT), R. Fitzgerald (NIST), C. Fréchou (LNE-LNHB), R. Galea (NRC), V. Gressier (LNE-IRSN), S. Jozela (NMISA), S. Judge (CCRI Executive Secretary), L. Karam (NIST), J. Keightley (NPL), J. Kim (KRISS), A. Knyiak (GUM), C. Kottler (METAS), T. Kurosawa (NMIJ/AIST), W. Louw (CCRI President / CIPM President), F.J. Maringer (BEV), T. Matsumoto (NMIJ/AIST), M. McEwen (NRC), R. Méndez Villafañe (CIEMAT), D. van der Merwe (IAEA), M. Milton (Director of the BIPM), N. Moiseev (VNIIM), Z. Msimang (NMISA), R. Nutbrown (NPL), C. Oliver (ARPANSA), V. Peyrés (CIEMAT), S. Pommé (JRC-Geel), J. de Pooter (VSL), N. Roberts (NPL), M. Sené (CIPM Member), J. Stenger (PTB), J. Suran (CMI), L. Szucs (BFKH), R. Tosh (NIST), F. van Wyngaardt, J. Wu (NIM), A. Yunoki (NMIJ.AIST), J. Zhang (NIM).

Also present: S. Bergstrand (Executive Secretary of the JCRB), D. Burns (BIPM), R. Coulon (BIPM), S. Courte (BIPM), C. Kessler (BIPM), C. Michotte (BIPM), M. Nonis (BIPM), S. Picard (BIPM, KCDB Coordinator), P. Roger (BIPM).

The CCRI President, Dr Louw, opened the meeting by welcoming all participants and thanking them for attending. A round of introductions was initiated by Dr Milton. All meeting participants introduced themselves by stating their names and institution affiliation. Following the introductions, Ms Rebecca Nutbrown from the NPL was appointed as the *rapporteur* and the agenda was formally approved.

The BIPM Director Dr Milton also welcomed delegates to the meeting and gave a brief update from the BIPM. There are currently 59 Member States and 42 Associates. The CIPM MRA now involves 101 national metrology institutes and 156 designated institutes. World Metrology Day was marked on 20 May 2019; the posters for the event were designed by the APMP (AFRIMETS will design the posters for 2020). The theme was the changes to the SI agreed in 2018. More information is available on worldmetrologyday.org.

Dr Milton summarized the outcomes of the 26th meeting of the CGPM in November 2018. The CGPM had approved the revision of the SI, and had also endorsed the objectives of the BIPM and the dotation. The CGPM elected a new CIPM with 18 members, who, in turn, elected the bureau. New presidents were appointed for CCQM and CCTF, and other presidents were re-elected.

Consultative Committees have common objectives. In summary, these are: to progress the state of the art, to demonstrate and improve the global comparability of measurements and to define new possibilities for metrology to have an impact on global challenges. Dr Milton added that Consultative Committees are consensus-based decision-making bodies and that they are well positioned to interact with stakeholders.

Dr Louw noted that the meeting would have to be compressed as the Parc de Saint Cloud authorities

were closing access to the BIPM site for safety reasons due to extreme weather conditions. More details on some topics are therefore given in presentations available online on the restricted BIPM website for working documents.

5 REPORT FROM THE CCRI PRESIDENT

Dr Louw started by summarizing the report he had given to the CGPM meeting in November 2018. The presentation emphasized the impact of ionizing radiation metrology in healthcare and environmental protection. Dr Louw had also explained the steps taken to ensure that the CCRI was more inclusive and described how operations had become more streamlined (in 2015, the CCRI needed 20 working days, this was reduced to 10 in 2017). The presentation had also covered the joint use of facilities (such as the DOSEO platform) and the interaction with liaison organizations and stakeholders, as it was important to demonstrate that the CCRI was not an isolated organization.

One issue had been the need to apply CIPM rules for Consultative Committees to the CCRI. The CIPM had accepted the proposal that Member States with representation on all three CCRI Sections would automatically become members of the CCRI, and those with representation on two Sections would become official observers. The CCRI therefore has eight members plus fourteen official observers and liaison organizations including the IAEA, the ICRU and the JRC (Geel). Any Member State not represented by an official observer can apply to attend the CCRI meeting as an observer; the application should be sent in writing to the BIPM Director. The issue of membership of the CCRI would be discussed again later in the agenda.

Dr Louw explained that the CIPM is seeking to improve the efficiency of comparison exercises. One approach being championed is limiting the number of participants in ‘round robin’ exercises, this is applicable to radiation dosimetry and neutron metrology when instruments or sources are circulated. Dr Louw emphasized the need for pragmatism to ensure that comparisons are fit for purpose, and that it is for the ionizing radiation community to decide the best approaches to improve the efficiency of comparison exercises.

The processes to review CMCs also could be made more efficient; however, the number of CMCs is not a good metric in itself. Compressing several CMCs into one CMC may in fact result in a complex CMC which is more difficult to review. Using a risk-based approach could be beneficial.

Arrangements for the CCRI meetings in 2021 will take into account lessons learned including how best to align the meetings with other international conferences.

Dr Louw concluded by discussing the process followed to develop the long-term strategy. The main aim was to address the needs of the stakeholders including the grand challenges facing Member States. Improving communication had to be an important part of the strategy. Dr Louw noted that the BIPM does not have the funding to address all the requirements so the strategy has to prioritize the work, but there were opportunities for secondments and sabbaticals to the BIPM.

Dr Karam asked about the number of LINACs being used for radiotherapy. Dr Judge explained that the IAEA DIRAC database gave a figure of 11 400 LINACs worldwide at present.

Dr Louw confirmed that as he had been elected President of the CIPM he would regretfully have to step down as President of the CCRI. A new CCRI President will be elected at the CIPM meeting in October 2019.

6 NEW KEY COMPARISON DATABASE

Dr Picard said that the CIPM MRA had been in place now for nearly 20 years. The implementation of the CIPM MRA had been discussed at the NMI Director's meeting in 2016; one of the decisions was to update the Key Comparison Database (KCDB) software. The main changes to the software will be:

- A tool for submitting and reviewing CMCs, avoiding the need to use spreadsheets
- Support for comparisons and collating statistics on comparisons
- Improved search tools

The new KCDB will have four parts: CMCs, Comparisons, News and Statistics. User accounts will be set up for reviewers, including accounts for TC Chairs. Training will be made available to all users. The intention is that the new KCDB will be in operation by the end of 2019.

7 MEMBERSHIP OF THE CCRI

Dr Louw re-iterated the CIPM decision on the membership rules of the CCRI, which had been summarized in CCRI document 17.12. CCRI Sections were to operate as Working Groups and international organizations became liaison organizations rather than members. The first part of this revision of operation of the CCRI had been completed.

The next question to address was how to broaden membership of the CCRI; the criteria that membership of all three Sections was necessary had been relaxed and applications for membership were invited from observers with active metrology research programmes in at least two of the three fields. An email had been sent to observers explaining that applications to become members must be sent in writing to the BIPM Director. As CCRI meetings are only held once every two years, requests may also be dealt with by correspondence.

Dr Karam asked whether the Section meetings should be open to all NMIs/DIs including those new to the field. Dr Milton responded that the Section meetings should be inclusive and there was an emphasis on bringing together all the institutes. Dr Louw pointed out that one advantage of the new arrangements was that Sections no longer require approval from the CIPM for applications for Section membership.

8 REPORTS FROM SECTIONS AND WORKING GROUPS

8.1 Section I: x- and gamma rays, charged particles

Dr McEwen (Chair – CCRI Section I) summarized the discussions that had taken place during the Section I meeting. The Section meeting had involved representatives from all of the RMOs and the ICRU, IAEA, AAPM and ASTM. However, radiation processing had been under-represented and a new liaison will be sought for the 2021 meeting.

Dr McEwen noted that the BIPM services and technical expertise were valued by CCRI Section I. The BIPM workload was significant even with the support from secondees; comparison services were already booking into 2020 and the service was at full capacity to deliver the basic work programme. Dr McEwen noted that secondees can be very helpful but should not deliver the comparison services on a routine basis, their main role should be to support research projects and it was important to ensure that the secondments benefit both the NMI/DI and the BIPM.

The closure of the ^{137}Cs irradiation facility at the BIPM was regrettable but the proposed replacement service using the IAEA facility should be workable (the situation should be monitored closely to check for the impact on participants and the BIPM).

Dr McEwen expressed the strong support from the Section for the BIPM to maintain a ^{60}Co irradiation facility into the long term and recommended that the BIPM should consider replacing the irradiator in the next few years to enable comparisons of calorimeters. The ^{60}Co facility provides the reference beam that underpins all dosimetry for radiotherapy and it was the view of the Section that it is essential to the international measurement system in this field.

Comparison exercises were continuing as planned, with a continued strong demand for the BIPM services. A comparison for high dose rate ^{60}Co measurements was starting, with NRC as the pilot but not as a participant. There were relatively few RMO comparisons underway. Opportunities to improve the efficiency of comparison exercises had been discussed but no easy options had been identified. Future comparisons are likely to include proton dosimetry, which is a higher priority than electron dosimetry.

The role of the Key Comparison Working Group (KCWG(I)) was to be expanded, including a more robust approach to reviews of reports, an objective approach to identifying which key comparisons are needed to support which CMCs, and improving the co-ordination between RMOs and the BIPM for comparison exercises. The KCWG(I) would also have a role in answering technical questions about comparisons and standards, and would act as a technical resource for laboratories. New members and a new Chair were being sought (Dr McEwen is currently acting as KCWG(I) Chair in addition to Section Chair).

The Section had also reviewed the proposed new Service Categories. It was noted that the most significant improvement had been combining rate and integral quantity as a single category.

Scientific developments likely to impact the field in the longer term had been identified as dosimetry for proton and ion beams, advances in radiobiology, the use of low-energy beams for radiation processing, electronic brachytherapy, synchrotron beams and radionuclide therapy.

The Section had noted significant progress in recent years; the results from key comparison exercises were consistent, the new ICRU data were being adopted widely, RMOs were very active, the EMPIR programme had been very successful in co-ordinating research activities and there was at least one NMI/DI with active research projects addressing the vast majority of technical challenges in the field. However, the Section had concerns about the further out-sourcing of BIPM facilities, the regulatory challenges to the use of sealed sources in general, dosimetry for KV blood irradiators, and the loss of expertise in radiation processing dosimetry (with experts at the NIST, NPL and DTU retiring).

The Brachytherapy Standards Working Group had been formed 10 years ago, and should be re-started to address the issue of electronic brachytherapy.

The Section supported the proposal to establish a new joint Section I and II working group concerning dosimetry and quantitative imaging for molecular radiotherapy.

Dr McEwen concluded by reporting that several new members of CCRI(I) had been proposed: DTU (Denmark), SSM (Sweden) (previously represented by NRPA), CCHEN (Chile) (new SIM member) and NIS (Egypt) (if confirmed by AFRIMETS). Other candidates were STUK, INER and OAP.

Dr Karam commented that establishing a new joint working group for molecular radiotherapy and quantitative imaging was an important initiative, and that (as Section II Chair) she would be contacting Dr McEwen to progress the formation of the working group. Dr Karam added that CCHEN was active in all three fields covered by the Sections and might apply for membership of CCRI; Dr McEwen said that CCHEN would have to follow the formal process and meet all of the criteria, but membership of the CCRI Sections is beneficial to institutes new to the field. Dr Karam considered that a new category between ‘member’ and ‘guest’ might be useful. Dr McEwen added that secondary standards dosimetry laboratories have significant expertise in the field but do not participate in comparison exercises for internal reasons, so participation in a key comparison should not be a limiting factor.

In response, Dr Louw said that guidelines would be useful but the aim should be to be inclusive. There are two levels of observer – an official observer is automatically invited to future meetings whereas an observer has to ask to attend. Dr Gressier said there was also a lack of clarity over participation in comparison exercises and whether participants had to take part in the relevant Section meetings. Dr Milton explained that rules for participation had been published but in practice the CCRI should take into account the issues in particular fields, which could be different for different Sections.

Applications for membership of CCRI Section I by DTU (Denmark), SSM (Sweden) and CCHEN (Chile) were endorsed by the CCRI. It was agreed to delegate the decision on membership of NIS (Egypt) to Dr McEwen as Section I Chair, following consultation with AFRIMETS.

8.2 Section II – Measurement of radionuclides

Dr Karam (Chair – CCRI Section II) presented the outcomes from the Section II meetings, starting with the Key Comparison Working Group (KCWG(II)). This working group is chaired by Dr Keightley and has continued to meet twice per year.

A 10-year plan for comparisons has been developed. Previously, the plan had been focused on enabling NMIs/DIs to claim CMCs for a wide range of radionuclides using the Measurement Methods Matrix (MMM) to underpin 'how far the light shines' statements. Although maintenance of the MMM has continued, radionuclides will now be selected on a 5-year rolling programme covering the main applications (medical (2021), gaseous (2022), calibration / tracer (2023), industrial (2024), environmental/reactor cycle/monitoring (2025)). It was noted that it may be possible to obtain homogeneous materials from the IAEA for comparison exercises.

The KCWG(II) had also discussed the publication of reports on comparison exercises. The consensus was that authors should be encouraged to publish in the *Metrologia* technical supplement but other publications could be accepted (subject to approval by Section II Chair and review by the CCRI Executive Secretary to ensure that the publication covers the topics expected for a report).

The agenda for the CCRI Section II meeting had been aligned to the generic Consultative Committee objectives. It was noted that the KEBS (Kenya) was a member of the APMP TC-IR and the CCHEN had joined SIM and already attended several TC-IR meetings. Following an update from the CCRI President, the BIPM had given a brief summary of progress. For regulatory and safety reasons, the BIPM must dispose of the set of ^{226}Ra sources used as the basis of the SIR since 1976. A detailed study of alternative sources has been carried out by Mr Jerome from the NPL, the conclusion being that ^{166m}Ho was the only viable alternative. A collaborative project (involving the NPL, IRA-METAS and LNHB) is underway to produce new sources; the production technique will be published so that the sources can be replicated. A second project (involving the NIST, PTB and NPL) has also started to investigate the use of new low electrical current measurement techniques to reduce the dependence on sources. A new joint CCEM-CCRI Task Group had been proposed to provide expert guidance, to give advice on key decisions, to help identify secondees and to promote the outcomes to achieve the best impact from the work.

The Section had discussed the use of the SIRTI instrument for comparisons of short-lived gamma emitting radionuclides (mostly used for medical imaging). The instrument had been used in fourteen countries for four radionuclides and was currently back at the BIPM to be characterized for new radionuclides following a scheme developed by the KCWG(II).

Dr Karam also noted the progress being made on the Extended SIR at the BIPM, which will enable 'on-demand' comparison services for pure beta and alpha emitters, to complement the SIR and the SIRTI. A thorough review of different approaches had been completed, and the development is now concentrated on a variant of the TDCR method. The scoping studies had showed promising results.

The Section had reviewed progress on comparison exercises. COOMET had proposed a comparison of radionuclide calibrators but there were found to be significant problems in transporting high-pressure ionization chambers so the proposal had been cancelled. SIM has organized two comparisons: the ^{152}Eu comparison has been delayed but ^{65}Zn is on schedule. The ^{55}Fe comparison proposed by EURAMET had been adopted as a CCRI comparison. APMP had proposed two

comparisons (mixed radionuclides in mushroom powder and mixed radionuclides in oyster powder); both will go ahead, but the mushroom powder comparison will be adopted as a CCRI comparison.

Section II recommended adoption of the proposals for new service categories and rules, for the period of validity of comparisons and for the interpretation of CMCs.

Other new actions agreed had been to compile information on potential new stakeholders (such as the United Nations) and to clarify the definition of a 'primary standard' in radionuclide metrology. The important issue of nuclear decay data had also been discussed; the conclusions were that the measurement of decay data should be included wherever feasible in protocols for comparison exercises and that members were encouraged to support the measurement and evaluation of data.

Dr Karam concluded by requesting the CCRI's agreement that: (1) CCHEN should be accepted as a member of CCRI(II); (2) The new service categories and rules should be adopted; and, (3) Comparisons should be valid for a period of 15 years plus 5 years in exceptional circumstances. The consensus in CCRI was that it was too early for CCHEN to become a member but it should be feasible in the short term. The adoption of the new service categories and rules was agreed.

Dr McEwen questioned the need for a 15-year validity period as Section I had agreed on a period of 10 years (plus 5 years only in exceptional circumstances). Dr Karam responded that there were 230 radionuclides to cover, all of which could require measurement in different matrices, so realistically a longer period was needed. It was still necessary to maintain the quality system of course so that there remains an independent check on competence.

Dr Picard confirmed that reports on comparison exercises do not have to be published in the *Metrologia* technical supplement but the requirement for peer-review for publication in the KCDB remains. Dr Karam said that the technical supplement is preferred as more detail can be included than may be possible in a journal article.

Dr Picard requested that the KCDB office is kept informed of any changes to service categories as these are included in the KCDB software. Dr Louw emphasized the need to involve the KCDB office in any decisions to ensure that the changes are feasible within the constraints of the software.

The proposal to establish a joint CCRI-CCEM task group on low electrical current measurement for ionization chambers was approved by consensus. Dr Judge reported that a possible co-chair had been identified from the CCEM community.

It was agreed that Dr Karam and Dr McEwen would progress the formation of the working group for quantitative imaging and radionuclide therapy.

8.3 Section III – Neutron measurements

Dr Gressier (Chair – CCRI Section III) gave a presentation on the Section meeting. The number of attendees at the meeting was stable; the view of the Section was that it should be inclusive and that all organizations attending the meeting should be invited to participate in comparison exercises. However, there are several individual cases given the specialist nature of the field: BARC (India) was invited to attend but has no CMCs, ARPANSA (Australia) has several CMCs but was not invited, NIS (Egypt) was invited but did not attend, CIAE (China) attended but does not have an official status, IFIN-HH (Hungary) requested an invitation but did not attend.

On-going comparisons had been reviewed in detail; there are three comparisons in progress (K9 AmBe source neutron emission rate, K9 Cf-252 source emission rate and a Supplementary comparison on H*(10) measurements with fifteen participants (delayed to the end of 2021)).

A supplementary comparison CCRI(III) S2 Hp(10) is being planned, discussions are underway on the technical protocol. Key comparisons are also planned: CCRI(III) K12 mono-energetic neutron fields, scheduled for 2020-2021 with eleven participants and CCRI K8 comparison, piloted by IRSN. A pilot study on gold-foil activation in thermal neutron fluence will also be conducted (the protocol is to be defined, the BIPM will participate in the activity measurement).

Section III had also reviewed in detail the proposed changes to service categories. A consensus had been reached to simplify the structure by removing ambient dose equivalent / rate, adding adsorbed dose / rate, remove graphite as a possible material and reduce the number of options for sources. Dr Fréchou commented that it was necessary to retain the old numbering system for backward-compatibility so the new structure would have numbers that are out of sequence.

Dr Gressier went on to explain that the Section had reviewed the new CCRI Strategy document in detail and welcomed the new format. Some changes had been introduced to reflect the need to extend the range of neutron energy and intensity, to consider emerging needs for high-energy neutron fields and high-intensity pulsed fields.

Dr Gressier concluded by explaining that it was important for NMIs to share the use of the scarce neutron metrology facilities and to co-ordinate activities to enable centres to specialize.

8.4 RMO Working Group

Ms Msimang (Chair – RMO Working Group) summarized the work carried out in the RMO Working Group Meeting. The rules for the validity period for comparison exercises had been discussed in detail but it was noted that the RMO Working Group's recommendation had not been fully adopted by the Sections or the CCRI. The validity period would therefore be 10 years (+5 in exceptional circumstances) for Sections I and III, and 15 years (+5 in exceptional circumstances) for Section II.

The interpretation of a CMC had also been discussed and it was noted that the definition of CMC cannot be changed without changing the CIPM MRA. The definition had however been qualified in CIPM MRA-D-02 Version 3.3 September 2018 'Use of the CIPM MRA logo and certificates statement' and the CIPM logo could be used if the instrument used was listed in the CMC, the

measured quantity was within the range of the published CMC, the measurement uncertainty was no less than that stated and the traceability was documented and reviewed as part of the quality system.

Dr Louw highlighted the role of the quality system in linking a service to a CMC. Dr Karam explained that the existing approach to CMCs (one line per service) could still be used if needed, but the new approach would enable institutes to use the quality system to link services to a reduced number of CMCs. Dr Stenger asked if this approach had been harmonized with the CCQM; Dr Milton responded that the approach had been based on the procedures used by the CCQM and Dr Louw confirmed that CMCs had already been interpreted in this way, so guidelines already existed.

The meeting noted that this decision approves the recommendation of the RMO WG that the CIPM MRA logo and statement on calibration certificates can be used for services not published directly as a CMC but which are traceable to a published CMC. This decision enables greater flexibility in the range of services offered, as proposed by EURAMET.

On a related topic, Dr Judge raised the issue of the process to approve comparison reports for inclusion in the KCDB. Following consultation with the CCRI President, Section I had operated a streamlined system: Draft B reports were circulated to Section I participants for a period of 6 weeks for comment. Any comments were collated by the CCRI Executive Secretary and passed back to the author to revise the report. If the changes were substantive, the report would be circulated again to Section I participants, otherwise the report would be sent to the Section Chair for approval. On receipt of an email from the Section Chair, the CCRI Executive Secretary sends the report to the KCDB office for publication. This process ensured that the relevant experts had the opportunity to review the report and reduced the delays for approving reports due to waiting for the next CCRI meeting to approve comparison reports. The consensus of the CCRI was that this process could be adopted by all three sections (i.e., responsibility for approving comparison reports would be delegated to the CCRI Sections for the review and the CCRI Section Chair for approval).

8.5 Appointment of Section and Working Group Chairs

Dr Louw thanked the Section Chairs and confirmed that there would be no changes for the Sections. The CCRI endorsed the new approach to appointing the Chair of the RMO Working Group to ensure fair representation of the RMOs balanced by some continuity: meetings will be chaired by the TC-IR Chair from an RMO for a period of four years, with the RMOs taking on responsibility in alphabetical order starting with AFRIMETS. The responsibility for chairing the meeting is with the relevant TC-IR Chair not the individual.

9 MEMBERSHIP OF THE CCRI

Dr Louw reported that two requests for membership of the CCRI had been received at the time of the CCRI meeting in 2017 (CMI (Czech Republic) and IRA-METAS (Switzerland)). These applications had been received at a time when the CCRI was being re-organized and consequently had not been progressed. Subsequently a new call was made.

In response to an email from the CCRI Executive Secretary, three applications had been received by

the BIPM Director (BEV (Austria), NMISA (South Africa) and IRA-METAS (Switzerland)). Dr Suran pointed out that CMI did not understand that they had to apply again since they had indicated their interest. The meeting agreed that the CMI application could be considered.

Dr McEwen said that the NRC (Canada) was also interested in applying for membership and would pursue this at the earliest opportunity.

Dr Maringer explained that the work at the BEV was focused on radiation dosimetry (since 1979) and radionuclide metrology (since 1989). There are nine members of staff, including five academics. The BEV has 52 CMCs in radiation dosimetry and 100 CMCs in radionuclide metrology, and has been an active participant in CCRI Sections I and II. The BEV has published more than 150 research papers in the field. The CCRI was pleased to support the application.

Dr Suran said that CMI's application for membership would be re-iterated in a letter that will be sent to the BIPM Director. The Chairs of Sections I, II and III confirmed CMI's active and valued contribution to the field, and the CCRI was pleased to endorse the application.

The delegate from IRA-METAS was unable to attend the CCRI meeting due to illness. However, the Chairs of Sections I and II confirmed IRA-METAS's many contributions to radiation dosimetry and radionuclide metrology over many years, and the application was also endorsed by the CCRI.

Ms Msimang set out the case for membership for the NMISA. The NMISA is a member of the IAEA/WHO SSDL network and is active in radiotherapy dosimetry (absorbed dose) and brachytherapy dosimetry (^{60}Co and ^{192}Ir), as well as dosimetry for diagnostic radiology and radiation protection. It is the only institute in the region with a capability in radionuclide metrology, and is re-establishing a capability for radon monitor calibration. The NMISA has close links with the iTHEMBA laboratory (designated by NMISA for medium and high energy neutron measurements) and work in neutron metrology is expanding. The laboratory is accredited to ISO/IEC 17025. All three CCRI Section Chairs supported the application and it was endorsed by the CCRI.

Dr Louw will put the cases forward at the CIPM meeting in October 2019 for final approval.

Dr Louw proposed setting up a round robin process to enable other observers to apply to become members, after which a formal application could be sent to the BIPM Director and the case would be considered at the CIPM meeting. Dr Karam asked whether discussions on the applications should be held with the representative in the room; Dr Louw responded that he considered the CCRI to be a mature community and that an open discussion was reasonable. Dr Milton said that the CIPM should prepare clear guidance to all Consultative Committees on the procedure to follow, as different Consultative Committees have different approaches.

Dr Milton added that there is an intention to formalize the arrangements with liaison organizations at the Consultative Committee level. Dr Keightley asked if a liaison would be possible with the IEC in addition to the ISO, Dr Milton replied that this would be possible.

10 REPORTS FROM REGIONAL METROLOGY ORGANIZATIONS

Reports from RMOs are available in the working documents area of the BIPM website for the meeting. Due to time pressure, regional representatives were asked just to highlight any major points.

AFRIMETS reported that the focus for most countries in the region is to establish capabilities for dosimetry for diagnostic imaging. Training is also a significant issue and there is a close co-operation with the IAEA.

There were no other major issues highlighted.

11 REPORTS FROM LIAISON ORGANIZATIONS

Dr Burns (on behalf of the ICRU) reported that the ICRU had published a report (ICRU90) to update the key data used in radiation dosimetry, a significant advance in the field. The CCRI had been instrumental in ensuring that these new data were adopted worldwide.

Dr van de Merwe said that there is a detailed written report from the IAEA available on the BIPM website (CCRI(I)/19-04). For the record (from the report), the Dosimetry and Medical Radiation Physics Section (DMRP) has eighteen members of staff, and its aim is to ensure medical procedures involving radiation are performed safely and effectively in IAEA member states. Three projects are underway: the provision of calibration services to Secondary Standards Dosimetry Laboratories (SSDLs), the development of codes of practice and auditing methodologies, and the development of guidelines for clinical practice. The IAEA supports a network of 87 laboratories in 72 Member States, providing calibration services, guidance documents and auditing services, plus expert missions and training courses. There are also co-ordinated research projects underway in the field, covering topics such as dosimetry for radiopharmaceutical therapy and the optimization of paediatric imaging. The IAEA also has an extensive programme of training courses and publishes web-based training material. In addition, the IAEA maintains databases relevant to the field, such as the Directory of Radiotherapy Centres (DIRAC).

Dr Pommé reported that the JRC remains active in radionuclide metrology and neutron measurements.

12 A PROPOSED NEW APPROACH TO COMPARISONS – 'HUBS'

Dr Louw invited Dr Stenger to give a presentation on a proposal for a new approach for specific comparison exercises.

Dr Stenger started by summarizing the progress that the CCRI had made in formulating a dynamic strategy and working with the BIPM, highlighting the close level of co-operation. NMIs/DIs have access to a wide range of facilities but they are distributed unevenly. There have been practical barriers to sharing the use of the facilities across borders, resulting in large disparities between the resources available to different NMIs/DIs. In some cases, as a consequence, major facilities are under-used and/or not modernized due to limited national resources.

Solving the future challenges for ionizing radiation is likely to need access to major facilities but the costs will deter many NMIs/DIs from investing. Dr Stenger therefore proposed that the BIPM could act as an independent and neutral lead to co-ordinate the exercises and resolve the practical issues concerned with access to the facilities – to set up a 'hub' for the exercises without the need for the BIPM to invest in new laboratories. The benefits would be the major facilities would be available to more NMIs/DIs, the facilities would be better used, and the impact of ionizing radiation metrology would be enhanced through addressing new challenges. The activity is also likely to stimulate new research projects. Dr Louw proposed that the first step would be to identify the major facilities available and asked the BIPM to collate the data.

13 REPORT FROM THE BIPM

Due to time constraints, Dr Judge gave a brief summary of the progress at the BIPM; the full presentation is available on the BIPM website (CCRI/19-05). The dosimetry comparison and calibration services continue to be heavily used, and bookings are now being taken for 2020. The comparison services for radioactivity are also well used, and good progress is being made on expanding the services to pure alpha and beta emitters (a joint project with the POLATOM, LNHB, PTB, NIM and NIST).

The BIPM has made significant contributions to key publications in the field, such as the ICRU90 report on data for dosimetry and IAEA guidance documents. Research projects have included an investigation of the dependence of ionization chamber calibrations on the type of linear accelerator (with the NRC, LNHB and DTU), backscatter correction factors (with the IAEA), characterizing reference qualities for low energy x-rays (with the VNIIM), replacing ^{226}Ra sources (with the IRA-METAS, NPL and LNHB), and improving low electrical current measurements for ionization chambers (with the NIST, PTB and NPL). Dr Judge emphasized that all such development projects are carried out in close collaboration with experts from NMIs/DIs working in small project teams and thanked all those who had contributed.

Dr Judge concluded the brief summary by explaining that there are opportunities for secondments and sabbaticals to work in the Department. Dr Cojocaru (NRC) spoke about his time as a secondee at the BIPM, explained that the BIPM has a good system in place to help with the practicalities of working in another country, said that it had been a very worthwhile experience of benefit to all parties and that he would encourage others to participate in the scheme.

14 FUTURE WORKSHOPS

Dr Louw said that EURAMET is organizing a comparison workshop at the NPL on 9-11 October 2019. Dr McEwen reported that a workshop on radiation processing is being planned.

15 ANY OTHER BUSINESS

Dr Louw asked for feedback on the arrangements for the meetings. There was feedback that the new arrangements had encouraged more interaction between the different Sections. Although one of the meeting rooms was not designed to meet modern IT requirements, this had encouraged participation. It was thought that it would be helpful to allow some additional time between meetings to enable Section and Working Group Chairs to prepare for later meetings. Timing the meeting to follow on from other international meetings had a mixed view: it had made some travel arrangements easier, but some delegates preferred not to be away from their institute for a long period and organizing visas remained complicated (even for travel within the Schengen zone). Dr Louw asked delegates to send any further feedback to the CCRI Executive Secretary so that this could be taken into account for the CCRI meetings in 2021 (date to be decided).

16 CLOSE OF MEETING

The delegates thanked Dr Louw for his expert leadership of the CCRI and wished him well in his new role of President of the CIPM.