

**International Committee
for Weights and Measures**

Proceedings of Session I

of the 104th meeting

(9-10 March 2015)

Executive Summary

Session I of the 104th meeting of the CIPM (9-10 March 2015)

CIPM bureau

The new members of the CIPM bureau were elected according to the rules in the Criteria and Process for Election of CIPM Members. The CIPM bureau consists of Dr Inglis (President), Dr McLaren (Secretary), Dr May (Vice-President) and Prof. Ullrich (Vice-President).

BIPM Work Programme for 2016-2019

The CIPM approved the BIPM Work Programme for 2016-2019.

BIPM Capacity Building and Knowledge Transfer Programme

The CIPM welcomed the proposal from the BIPM for a Capacity Building and Knowledge Transfer Programme and gave its unanimous support.

Awareness campaign for the new SI

The CIPM approved a proposal made by the CCU President to start an awareness campaign relating to the new SI.

CIPM Strategy and Objectives

The CIPM began a wide-ranging debate on its strategy and objectives.

Appointment and re-appointment of CC Presidents

The Presidents of the ten Consultative Committees of the CIPM were appointed, or re-appointed, for 4-year terms.

Review of the CIPM MRA

Progress with the review of the implementation and operation of the CIPM MRA was reviewed and the plans for the workshop to be held in October 2015 were discussed.

**MEMBERS OF THE
INTERNATIONAL COMMITTEE FOR WEIGHTS AND MEASURES**

As of 9 March 2015

President

B. Inglis, National Measurement Institute (NMI), Lindfield, Australia.

Secretary

J.W. McLaren, Ottawa, Canada.

Vice-Presidents

W.E. May, National Institute of Standards and Technology (NIST), Gaithersburg, United States of America.

J. Ullrich, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany.

Members

B.R. Bowsher, National Physical Laboratory (NPL), Teddington, United Kingdom.

H.S. Brandi, *Instituto Nacional de Metrologia, Qualidade e Tecnologia* (INMETRO), Rio de Janeiro, Brazil.

F. Bulygin, All-Russian Scientific Research Institute for Metrological Service, Rosstandart (VNIIMS), Moscow, Russian Federation.

M. Buzoianu, National Institute of Metrology (INM), Bucharest, Romania.

I. Castelazo, *Centro Nacional de Metrología* (CENAM), Querétaro, Mexico.

Y. Duan, National Institute of Metrology (NIM), Beijing, China.

L. Énard, *Laboratoire National de Métrologie et d'Essais* (LNE), Paris, France.

M. Inguscio, *Istituto Nazionale di Ricerca Metrologica* (INRIM), Turin, Italy.

D.-I. Kang, Korea Research Institute of Standards and Science (KRISS), Daejeon, Republic of Korea.

T. Liew, National Metrology Centre, Agency for Science, Technology and Research (NMC, A*STAR), Singapore.

W. Louw, National Metrology Institute of South Africa (NMISA), Pretoria, South Africa.

P. Richard, Federal Institute of Metrology (METAS), Bern-Wabern, Switzerland.

G. Rietveld, Van Swinden Laboratory (VSL), Delft, the Netherlands.

T. Usuda, National Metrology Institute of Japan (NMIJ/AIST), Tsukuba, Japan.

Honorary members

E. Ambler, Hilton Head Island, United States of America.

W.R. Blevin, Glenhaven, Australia.

L.M. Branscomb, La Jolla, United States of America.

J.V. Dunworth, Ramsey, Isle of Man, United Kingdom.

E.O. Göbel, Braunschweig, Germany.

K. Iizuka, Tokyo, Japan.

R. Kaarls, Zoeterwoude, the Netherlands. (Appointed an Honorary Member on 9 March 2015)

D. Kind, Braunschweig, Germany.

J. Kovalevsky, Grasse, France.

J. Skákala, Bratislava, Slovakia.

Agenda

1. Opening of the session, quorum and approval of the agenda.
2. Approval of the report of the Second Session of the 103rd Meeting (13 – 14 November 2014) and list of decisions
3. Report of the Secretary and activities of the bureau of the CIPM
4. Update on the activities of the BIPM by the Director
5. Financial matters
6. Report from the Chair of the CIPM Sub-Committee on the BIPM Pension and Provident Fund and Health Insurance
7. Election of the CIPM President, Secretary and CIPM Vice-Presidents
8. Report from the Chair of the CIPM *ad hoc* Working Group on Membership
9. Report from the CCM and update on the Extraordinary Calibration campaign
10. BIPM Work Programme 2016-2019
11. Plans for the development of elements of a BIPM Visitor Programme on a co-funded basis
12. Consideration of the arrears of the Islamic Republic of Iran
13. Update on the expected debate on the future of the “leap second” during 2015
14. Review of the 25th CGPM and actions arising from the Resolutions
15. Report from the Chair of the CIPM *ad hoc* Working Group on Conditions of Employment
16. Report on coordination and liaison at the BIPM
17. CIPM positions on revisions of ISO/IEC 17025 and ISO Guide 34
18. CIPM Strategy and Objectives
19. Presidency of the Consultative Committees
20. Chairmanship and membership of CIPM Sub-Committees and *ad hoc* Working Groups
21. CIPM representation on external bodies
22. Report from the JCRB
23. Review of the CIPM MRA
24. Future BIPM workshops
25. BIPM Terminology
26. Dates for CIPM Meetings in 2016 and 2017
27. Any other business

SESSION I OF THE 104TH MEETING OF THE CIPM – FIRST DAY - 9 MARCH 2015**1. OPENING OF THE SESSION;
QUORUM;
AGENDA**

The International Committee for Weights and Measures (CIPM) held Session I of its 104th meeting on Monday 9 and Tuesday 10 March 2015 at the International Bureau of Weights and Measures (BIPM).

Present: B.R. Bowsher, H.S. Brandi, F. Bulygin, M. Buzoianu, I. Castelazo, Y. Duan, L. Énard, B. Inglis, M. Inguscio, D.-I. Kang, T. Liew, W. Louw, W.E. May, J.W. McLaren, M.J.T. Milton (Director of the BIPM), P. Richard, G. Rietveld, J. Ullrich and T. Usuda.

Also attending the meeting were: C. Fellag Ariouet (Personal Assistant to the Director and Head of the Secretariat and Housekeeping Office), C. Planche (Librarian/Drafting Officer) and R. Sitton (Publications Officer).

The following were in attendance for parts of the meeting: I. Andernack (Head of the BIPM Finance, Budget and Procurement Office), E.F. Arias (Director of the Time Department and Executive Secretary of the CCTF), A. Henson (Director of the International Liaison and Communication Department), R. Kaarls (outgoing Secretary of the CIPM), V. Krutikov (former CIPM member), T.J. Quinn (Emeritus Director), M. Stock (Director of the Electricity Department, interim Director of the Mass Department).

Dr Inglis, President of the CIPM, opened the session. With all 18 members present the quorum was satisfied according to Article 12 of the Regulations annexed to the Metre Convention.

He commented that Session I of the meeting was unusual in that it was being held in the Pavillon du Mail rather than the Grande Salle of the Pavillon de Breteuil. There were also seven new members of the CIPM present at the meeting following the election held at the 25th CGPM meeting in November 2014. He noted that a new CIPM bureau will be elected later in the meeting. To aid with the transition from the 'old bureau' to the 'new bureau', the outgoing Secretary of the CIPM, Dr Kaarls, will be present for the first session. Dr Kaarls will also give his final Secretary's Report to the CIPM as well as a presentation on the work of the CIPM Sub-Committee on the BIPM Pension and Provident Fund and Health Insurance, in his capacity as the outgoing Chairman.

The President noted that a question had been raised since Session II of the 103rd meeting about why decisions and actions are not listed separately in the minutes. He recalled that following the 101st meeting (2011) it was agreed that only decisions should be recorded to avoid duplication, as most decisions also include an action. There was a brief discussion and it was agreed that this policy should continue, providing that the actions are monitored. It was noted that the CIPM bureau had agreed previously that when it is not specifically stated who is responsible for an action, it is the Director of the BIPM who assumes responsibility.

He asked for any comments on the agenda and noted that Prof. Ullrich had submitted three items for discussion that will be incorporated into item 14 on the review of the 25th CGPM meeting.

Dr Bowsher commented that he would like to have an open-ended debate about the future role of the CIPM and how it can best serve the metrology community. He added that this can probably be done within the discussions on the CIPM strategy under item 18.

Dr Richard gave a few reflections on the preparation of the CIPM meeting. He suggested that the items on the agenda should be numbered and the corresponding working documents should be referenced. He

also suggested that items on the agenda should include an indication of whether they are for information or decisions. When any associated working documents require decisions by the CIPM they should include a summary, particularly if the document is long, and possibly a draft decision prepared in advance. He also commented that he would like to receive all working documents, especially those for decisions, at least two weeks in advance of the meeting.

Dr Inglis replied that the CIPM was always looking for ways to make its meetings more efficient. The CIPM Bureau would consider how it could work towards the objectives proposed by Dr Richard whilst keeping the flexibility needed to manage the meeting effectively and to respond to the inputs made by CIPM members at the meeting.

The agenda was approved.

2. CONFIRMATION OF THE MINUTES OF SESSION II OF THE 103rd MEETING (13-14 NOVEMBER 2014) AND LIST OF DECISIONS

The minutes of Session II of the 103rd meeting (2014) had been approved by correspondence and were accepted as a true record.

Decision CIPM/104-01 The CIPM accepted the minutes of Session II of the 103rd meeting of the CIPM as a true record.

The President reviewed the decisions from Session II. The status of the following points was noted:

Decision CIPM/103-30 *The CIPM supported the proposal of CODATA to set a deadline of 1 July 2017 for submission of experimental data to be used by the CODATA Task Group on Fundamental Constants in the evaluation of the fundamental constants which will lead to the fixed values for the defining constants of the new SI.*

Prof. Ullrich will discuss this later in the agenda (see §14).

Decision CIPM/103-31 *The CIPM supported the BIPM in progressing to Phase II of the extraordinary calibration campaign using the international prototype of the kilogram and in disseminating corrected values for calibrations performed with respect to the BIPM mass unit. The BIPM will determine the associated uncertainties in collaboration with the CCM support group.*

The President of the Consultative Committee for Mass and Related Quantities (CCM) and the Executive Secretary will make a presentation later in the agenda (see §9).

Decision CIPM/103-37 *The CIPM asked Dr May to circulate the request of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) for traceability exception related to isotope ratio delta values to the CIPM members so that a decision can be made.*

Dr May commented that this had been circulated and that he will present a proposed amendment later in the meeting (see §27).

Decision CIPM/103-41 *The CIPM agreed to reflect on themes to be addressed by the BIPM/VAMAS Workshop “Challenges in materials metrology” planned in 2016; and make suggestions to give guidance to the workshop steering group by the end of January 2015.*

The President noted that he had not received much input from the CIPM. There had been a meeting with representatives from VAMAS and he will report on this later in the agenda (see §24).

Decision CIPM/103-43 *The CIPM agreed to establish a consortium of national metrology institutes and other institutes, coordinated by the NIST, to facilitate new work aimed at resolving the present disagreement amongst measurements of the Newtonian constant of gravitation, G . The BIPM will provide facilities for meetings of those taking part in this work.*

Dr Quinn stated that he and Peter Mohr from NIST, USA, will act as joint chairmen for the steering group. Actions to date are that the NIST has agreed to take over the BIPM apparatus which is currently at the University of Birmingham, UK. It will be transferred to NIST and a new measurement will be made using this apparatus. Dr Quinn is in discussions with Dr Steele at the NRC, Canada, to ask if it could take over the JILA experiment so that the two outliers in the present measurement of G can be verified. Work is also under way in China but there was no new information to report.

There were no further comments on the Decisions from Session II.

3. REPORT OF THE SECRETARY AND ACTIVITIES OF THE BUREAU OF THE CIPM

Dr Kaarls, Secretary of the CIPM, gave his report (see Appendix 1).

4. UPDATE ON THE ACTIVITIES OF THE BIPM BY THE DIRECTOR

Dr Milton commented that it was only three months since the 25th CGPM (2014) and the actions that have already been taken as a follow up will be presented. The CGPM marked a turning point in several important areas of the BIPM's work. Firstly it agreed a resolution referring to the redefinition of the SI. Although the resolution does not say so, it was clear from discussions that the intention is for this to occur in 2018. Secondly, during discussions about the proposed Visitor Programme, it was recognized that the BIPM should ensure that it provides a balance of benefits across all of its Member States. This will be discussed later in the meeting. Thirdly, the negotiations with the Islamic Republic of Iran during the previous CIPM meeting were a reminder of the type of interaction that is expected from an international organization. The BIPM is an international organization and on that occasion it was clear that it was necessary to relate to the delegates from the Islamic Republic of Iran in a formal way, in order to address their concerns.

While the CGPM gave important new directions for the BIPM, some changes had already been implemented in the way it carries out its work. The BIPM has developed the way its work programme is delivered and a more collaborative approach is being implemented. There have also been developments in the way the BIPM carries out its coordination work by adopting a strategy based on 'door-opening'. This strategy allows the BIPM to take advantage of its status as an international organization to gain access to meetings that are not always open to the NMIs. When the BIPM 'opens the door' to such meetings, the voice of the CIPM and the NMIs is allowed in. The BIPM is also taking a more formal approach to developing 'positions' on issues with the CIPM and there are several of these for discussion at this meeting. It is developing the way it participates and coordinates its work with countries that have a developing measurement infrastructure and the BIPM has an opportunity to play a stronger role in the Network on Metrology, Accreditation and Standardization for Developing Countries (DCMAS network).

While there was a very strong endorsement of recent developments at the BIPM from the CGPM and from the NMIs, many of whom provide indirect support for the work of the BIPM, the Director noted that when he looks at the challenges ahead he clearly recognizes that the long-term sustainability of the BIPM depends on it being efficient and effective in delivering a mandate that is relevant.

Staff and buildings

Dr Thomas, the KCDB Coordinator, will retire later in 2015 and Dr S. Picard has been appointed as KCDB Coordinator Designate to succeed her. Dr Olson (NIST) has joined the BIPM on a 2-year secondment as the Executive Secretary of the Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB).

Other appointments since Session II of the 103rd meeting are: Dr de Mirandés as the Executive Secretary of the Consultative Committee for Units (CCU); Dr Fang as the Executive Secretary of the Consultative Committee for Mass and Related Quantities (CCM); and Mr Sitton as the Executive Secretary of the Joint Committee for Guides in Metrology (JCGM).

An Electrician, an Accountant and a contracted staff member for IT are currently being recruited.

The study into the need to modernize elements of the Observatoire is ongoing. Architects will now be engaged to reorganize the front of the building. The Marie Curie building will be reorganized because of the pressures from the two departments that share the building. The Chemistry Department needs working space for its growing number of secondees and the Ionizing Radiation Department needs more laboratory space to ensure that it can carry out its work efficiently.

A redesign of the Grande Salle of the Pavillon de Breteuil is being considered, taking full account of its historical importance. The proposal is to change the layout and install a modern IT system.

A trial is under way to provide catering for meetings at the BIPM in a marquee in the garden. It is hoped that this will encourage more use of the garden.

IT security will be scrutinized during 2015 and an external consultant will carry out an audit.

Laboratory activities

The Mass Department supported the CCM meeting in February 2015. The CCM meeting marked the final meeting of the support group that was set up in collaboration with the Director of the BIPM to help with the work associated with the extraordinary calibration campaign with the IPK. The first paper describing the work of this campaign is due to be published in *Metrologia* in March 2015. Discussions are under way with the NPL regarding an offer to provide seconded expertise into the Mass Department which will strengthen the team. This support is very welcome.

The Electricity Department has made progress with the calculable capacitor project. The most accurate direct measurement to date of the von Klitzing constant has been made to 2 parts in 10^7 . Further progress is expected.

The Chemistry Department has published two papers so far in 2015. One reports new absolute absorption cross-sections for ozone. This is a turning point for the ozone measurement community where there has been historic disagreement over absolute values. It is now clear where the true answer should be and it is expected that regional and global bodies measuring ozone will change their recommendations as a result.

The Ionizing Radiation Department has received an offer from a major NMI to help the BIPM establish a reference linear accelerator facility. This is a significant and welcome opportunity and discussions will start in the near future.

The Time Department has published a paper in which they use the technique of integer ambiguity resolution to achieve frequency transfers via GPS satellites to 1×10^{-16} accuracy. This is a breakthrough

in the accuracy for GPS time transfers and means that these transfers can be a competitive alternative to fibre transfers in this range of accuracy.

The theme for 2015 is aligned with the UNESCO 'International Year of Light'. The poster was designed by the NMISA, South Africa, on behalf of AFRIMETS and is available on the website. This alignment of the theme will allow NMIs to take advantage of the significant promotional efforts going into the International Year of Light.

The President thanked Dr Milton for his report and invited questions and comments.

5. FINANCIAL MATTERS

Ms Andernack, head of the BIPM Finance, Budget and Procurement Office, joined the meeting and presented a summary of expenditure as at 3 March 2015 against the approved budget for 2015. There were no concerns about the budget so far.

Dr Bowsher noted that, following election, the Finance Sub-Committee would meet on 11 March where its focus would be on the planning to support the approval of the accounts for both the BIPM and the Pension Fund.

6. REPORT FROM THE CHAIR OF THE CIPM SUB-COMMITTEE ON THE BIPM PENSION AND PROVIDENT FUND AND HEALTH INSURANCE

Dr Kaarls reported on the work of the Sub-Committee and reviewed its activities since it was established in 2013. Discussions at the Sub-Committee's seventh meeting on 20 January 2015 focused on the implementation of Resolution 3 'On the Pension and Provident Fund of the BIPM' adopted by the 25th CGPM. The discussion focused on two main points: the establishment of an Advisory Board for the Pension Fund and the commissioning of additional studies with Mercer to define the steps needed to make a transition to an increased retirement age and contribution rate.

Dr Inglis thanked Dr Kaarls for his presentation and asked if any decisions needed to be taken. Dr Kaarls replied that the membership of the advisory board needed more discussion and that the amendments to the various regulations needed to be approved by the CIPM in October 2015. He noted that the Pension Fund Advisory Board will only have an advisory role; the decision-making body will continue to be the CIPM.

Dr Milton noted that the CIPM does not need to take a decision on the principle of setting up the Advisory Board since this had already been discussed at the CGPM. It would be asked to agree on a detailed proposal which will require amendments to several different regulations. Draft amendments are being prepared and will be presented to the CIPM for approval in October 2015.

Dr May commented that an expert advisor from a Member State with some knowledge of international organizations would continue to play an important role in the Sub-Committee. Dr Kaarls noted that Mr Christian Bock from Switzerland is the current external advisor to the Sub Committee and he is willing to continue in the role. Dr Bowsher asked for clarification of the Chairperson's role. Dr Kaarls

confirmed that he is stepping down as Chair of the Sub-Committee with immediate effect and hence it will require a new Chair. He confirmed that the Pension Fund Advisory Board will take over the role of the current Sub-Committee with respect to pensions when it comes into being. It was confirmed that the Chair of the Pension Fund Advisory Board should be a member of the CIPM.

The discussion on the Pension Fund Advisory Board concluded with an exchange of views on whether representatives of current and retired staff should be included. The consensus within the CIPM was that the current staff should be included, but the retired staff should not. Dr Milton noted that he will continue to consult staff representatives over the establishment of the Pension Fund Advisory Board and the transition to an increased retirement age and contribution rate.

7. ELECTION OF THE CIPM PRESIDENT, SECRETARY AND VICE-PRESIDENTS

The outgoing Secretary observed that the meeting was quorate and that the Director had opted not to exercise his right to vote as he is committed to work with those elected. All members of the CIPM had received an invitation to nominate members of the CIPM bureau along with an indication of the workload expected in each role. There had been one nomination for the President, three nominations for the Secretary and five for the Vice-Presidents. He recalled that the bureau should have a good geographic spread to represent the regions and that the nationality of the President, Secretary and the Director of the BIPM must be different according to the Metre Convention. Each person nominated was invited to give a short statement in support of their applications.

The sole nomination for the role of CIPM President was Dr Inglis. He gave a brief statement in support of his application. He stressed that his nomination would provide continuity, especially taking into account the fact that the Secretary was stepping down. He confirmed that if elected, he expected to be the President at the next General Conference in 2018.

The Secretary asked the CIPM if there were any objections to the election for the President being carried out by acclamation. There were no objections.

Decision CIPM/104-02 The CIPM elected Dr Inglis as President of the CIPM by acclamation.

There were three nominations for the role of CIPM Secretary: Mr Érard, Dr McLaren and Dr Richard. Each candidate gave a short statement. Following a secret ballot, Dr McLaren was elected.

There were five nominations for the two vacancies for CIPM Vice-Presidents. Dr McLaren withdrew his nomination following his election as Secretary. The remaining four were: Dr May, Dr Richard, Prof. Ullrich and Dr Usuda, each of whom spoke in support of their nominations. Following a secret ballot, Dr May and Prof. Ullrich were elected.

Decision CIPM/104-03 The CIPM elected the following by secret ballot:

- Dr McLaren as Secretary of the CIPM;
- Dr May and Prof. Ullrich as Vice-Presidents of the CIPM.

8. REPORT FROM THE CHAIR OF THE CIPM *AD HOC* WORKING GROUP ON MEMBERSHIP

Dr May recalled the background to the establishment of the *ad hoc* Working Group and its activities since it was established in 2013. He commented that there were two uncompleted tasks: to develop guidelines for selection of CIPM Consultative Committee (CC) Presidents and to provide good practices for the selection of CC Working Group Chairs and Deputy Working Group Chairs. He presented drafts of the two procedures. He noted that the guidelines for the selection of CC Presidents are similar to the criteria and guidelines for selecting CIPM members. Dr May stressed that the guidelines are not absolute rules; there is some flexibility to allow for circumstances such as provisional appointment of a CC President for a shorter period than four years. He confirmed that the fixed four-year terms for CC Presidents are not synchronized to meetings of the CGPM.

Dr Richard noted that Decision CIPM/103-10 charged the *ad hoc* Working Group on CIPM Membership to include a section in the document to cover the creation of new CC Working Groups and the closure, merger and confirmation of active Working Groups. He asked for an update on this proposal. Dr May responded that the *ad hoc* Working Group had decided to keep the guidelines as simple as possible and not to include such a section, however, this could be re-considered. He proposed that the CIPM should vote on the adoption of the draft document and further amendments such as this could be added at a later date. The Director suggested that the creation of new CC Working Groups and the closure, merger and confirmation of active Working Groups could be included in the document *CIPM-D-01 "Rules of procedure for the Consultative Committees (CCs) created by the CIPM, CC working groups and CC workshops"*. This document is in need of revision and could cover the criteria for CC Membership and Observership. He suggested that the CIPM bureau could make a proposal on the revision of *CIPM-D-01* at a future session.

Following a discussion, it was agreed that the 'Guidelines for selection of CIPM CC Presidents' and 'Good practices for the selection of CC Working Group Chairs and Deputy Working Group Chairs' would be amended to include some minor editorial changes and circulated to the CIPM for a decision on adoption before the end of the meeting.

Subsequently, the CIPM returned to the amended documents later in the agenda and adopted them. The documents can be considered for incorporation into document *CIPM-D-01* at a later date when it comes up for revision.

Decision CIPM/104-04 The CIPM adopted the documents 'Guidelines for Selection of CIPM Consultative Committee Presidents' and 'Good Practices for Selection of Consultative Committee Working Group Chairpersons and Working Group Deputy Chairpersons' dated 9 March 2015.

Dr Inglis commented that this was Dr Kaarls' final CIPM meeting after 21 years as a member and it would lose a major contributor. He said he wanted to record his appreciation to Dr Kaarls for his long and prestigious service to the CIPM and he thanked him and wished him well in his retirement. Dr Kaarls thanked the CIPM for their friendship and cooperation. He also thanked all of the BIPM staff for their support and input over the years. Dr Kaarls left the meeting.

9. UPDATE ON THE EXTRAORDINARY CALIBRATION CAMPAIGN AND REPORT FROM THE CCM

Extraordinary calibration campaign

Dr Stock joined the meeting and gave a report entitled “*Calibration campaign in anticipation of the kilogram redefinition: ‘Extraordinary Calibrations’*.” He commented that the results of the extraordinary calibration campaign had been discussed in detail at the CCM meeting in February 2015. This is the final report as the work is now finished; the first report had been presented at the previous meeting of the CIPM.

The objective of the extraordinary calibration campaign was to provide improved traceability to the international prototype of the kilogram (IPK) for NMIs involved in measurements of the Planck constant, h , or the Avogadro constant, N_A . The work was carried out in two phases. Details of Phase I were given in §6 of the report of Session II of the 103rd meeting of the CIPM. Corrections to previous mass calibrations have been determined from the results of Phase I. This information was supplied to LNE (France), METAS (Switzerland), NIST (USA), NMIJ (Japan), NPL (UK), NRC (Canada) and PTB (Germany) all of whom were involved in determinations of h or N_A .

Dr Stock explained why the corrections were needed. The definition of the kilogram is the mass of the IPK, but it, and its six official copies are rarely accessible; the last time before the present campaign was during the 3rd periodic verification (3rd PV) of national prototypes in 1988-1992. Since then, the mass unit has been maintained by a set of ten working standards, which had been calibrated against the IPK in 1992. This mass unit is known as the BIPM as-maintained mass unit. Working standards do not have perfect mass stability, so although the BIPM as-maintained mass unit is traceable to the IPK it cannot be considered to be strictly identical to the mass of the IPK. During the extraordinary calibration it has been observed that all BIPM working standards have lost mass with respect to the IPK since 1992 (3rd PV) of between 18 μg and 88 μg . The relative drift (of 70 μg) within the set of working standards had been noticed by BIPM, but not the common drift because the IPK was not available. The undetected common drift has led to the offset of the BIPM as-maintained mass unit. The mass loss correlates with the level of usage, leading to the hypothesis that a wear phenomenon, possibly in a mass comparator, was at the origin of the mass losses. (see §6 of the report of Session II of the 103rd meeting of the CIPM for more explanation of the common drift in the working standards and the comparator wear).

Phase II of the extraordinary calibration campaign involved calibration of the standards from NMIs involved in determinations of h or N_A , with respect to two BIPM working standards, Nos. 650 and 91, which were linked to the IPK during Phase I. Standards were calibrated for the LNE, METAS, MSL (New Zealand), NIM (China), NIST, NMIJ, NRC and PTB. The calibrations have been completed and the unofficial results have been communicated to the NMIs. Certificates will now be finalized following the CCM meeting in February 2015.

The President thanked Dr Stock and invited questions.

It was asked whether retrospective corrections will be required for NMIs that either purchased mass prototypes or had prototypes calibrated at the BIPM in the period 2000 to 2014. Dr Stock commented that the extraordinary calibrations were carried out for a specific group of NMIs, namely those that were involved in measurements of h or N_A . The subsequent discovery that there was a problem of mass drift with the BIPM ‘as-maintained’ mass unit indicated that a much wider group of NMIs is affected and this was discussed during the recent CCM meeting. This discussion led to a recommendation on how to deal with this, which will be described by Dr Richard in his presentation. He confirmed that all NMIs that have purchased mass prototypes or have had prototypes or stainless steel mass standards calibrated at the BIPM since 2003 will receive revised values for the calibrations.

Dr Stock was asked how lessons can be learned to prevent or detect problems such as the drift in the working standards at an earlier stage and how to prevent it. He replied that the best solution would be to have operational watt balances or silicon spheres rather than relying on artefacts. Until this solution becomes a reality, mass metrology will continue to rely on the stability of mass standards. To detect problems related to a mass drift, a hierarchical system of reference masses with different level of usage will be introduced at the BIPM.

The cause of the wear leading to the drift of the working standards was questioned and whether the process is well understood. Dr Stock commented that two comparators were used extensively during the period 2000 to 2010 when the problem is believed to have occurred. One has been tested and no problems could be found. The other has been out of service since 2010 and has been dismantled. This comparator will be put back into service to test whether the problems can be identified. He commented that the mass standards that were used the most often have lost the most mass but at present the explanation of wear in a comparator remains a hypothesis. This hypothesis is however supported by the results of mathematical modelling of past weighing data.

It was asked whether the corrected mass values attached to previous mass calibrations of platinum iridium mass prototypes will all have an uncertainty of 3 μg . Dr Stock commented that this has been extensively analysed and presented to the CCM. The uncertainty is within the model that was picked to best fit the data. Each parameter within the model that describes the behaviour of the mass standards has an uncertainty that propagates to these corrections. Another contribution to this uncertainty is the possible difference in the efficiency of the cleaning and washing of the IPK in 2014 and 1992. The Director added that during the analysis a conservative approach was used towards the estimates. The possibility that the model could be wrong was also considered but could not be quantified as an uncertainty contribution. The uncertainty value of 3 μg has been extensively discussed within the BIPM, the CCM Support Group and the CCM, and it is the best outcome currently available within the framework of the uncertainty analysis carried out.

The President thanked Dr Stock again and invited Dr Richard to give his presentation.

Report from the CCM

Dr Richard gave a short report on the outcomes of the 15th meeting of the CCM which was held on 26-27 February 2015. He began by presenting the *CCM recommendation to NMIs on managing the consequences of the corrections to the BIPM as-maintained mass unit* (see Appendix 2). He noted that it is not a CCM recommendation to the CIPM; it is sufficient that all of the NMIs that are impacted by the correction are informed. He noted that the BIPM is in the process of informing the individual NMIs of the corrections.

Dr Richard presented the joint CCM and CCU roadmap towards the redefinition of the kilogram in 2018 and gave an update of its current status. CCM Recommendation G1 (2013) set certain numerical conditions on the agreement of results and on uncertainties and recommends a pilot study to validate the procedures of the *mise en pratique (MeP)* for the realization and dissemination of the mass unit. The condition on consistency is close to being achieved. The CCM reviewed the situation with the CCM Recommendation G1 (2013) and will keep this under review as further results become available in 2015 and 2016. The results of the discussion will be reported to the CIPM. The CCM President will continue to work with Walter Bich from INRIM on this analysis in order to inform the CIPM at each meeting. The *MeP* has been provisionally approved, traceability to the IPK has been re-established and a special issue of *Metrologia* that will serve as a reference for the *MeP* is planned for 2016. He commented that all activities on the roadmap are currently on schedule.

The main conclusions from the CCM meeting were presented. The CCM reviewed its action plan for 2014 and defined an action plan for 2015-2016. The CCM '*Guidelines for approval and publication of*

the final reports of key and supplementary comparisons' were updated; the work to be completed is planned. Technical reports were received from the vast majority of CCM members for the first time.

Dr Richard finished his presentation by noting that he had initiated a joint strategy between the CCM and the International Association of Geodesy (IAG). This initiative has been officially approved by the President of the IAG.

The President thanked Dr Richard and invited questions.

There was an exchange of views over whether or not the *CCM recommendation to NMIs on managing the consequences of the corrections to the BIPM as-maintained mass unit* should be adopted as a CIPM recommendation. It was argued that the recommendation had been discussed and developed within the CCM and most of the stakeholders that it affected were present at the meeting, therefore its message had already been conveyed to the NMIs and no action was required by the CIPM. It was also mentioned that the message in the recommendation was very important and had there been a delay of several months between the CCM meeting and the CIPM meeting, this would have caused an unacceptable delay in disseminating the message to the NMIs. The counter argument was that the CCs should not communicate directly with the NMIs; recommendations by the CCs should be discussed and endorsed by the CIPM. To avoid unnecessary delays, any CC recommendations that are proposed a long time before a scheduled CIPM meeting could be dealt with by correspondence. Following a discussion it was agreed that the recommendation would be adopted by the CIPM, subject to minor editorial changes to transform it into the correct format (see Appendix 2).

The President thanked the CCM for its efforts on behalf of the CIPM and noted the reports by Dr Stock and Dr Richard and encouraged them to continue with the work towards the redefinitions.

Decision CIPM/104-05 The CIPM adopted the recommendation as presented to the CIPM by the CCM, CIPM Working Document CIPM/15-12, as "*CIPM Recommendation to NMIs on managing the consequences of the corrections to the BIPM as maintained mass-unit*".

10. BIPM WORK PROGRAMME 2016-2019

Mr Henson gave a brief presentation on the BIPM Work Programme 2016-2019. He recalled that the draft Work Programme, as presented to the 25th CGPM meeting, consisted of a series of prioritized projects with a cut-off line indicating which projects could be supported with the proposed budget. All projects on the list, including those below the cut-off line, had been deemed worthy of funding through the consultation processes, and this was recognized at the CGPM. The prioritization order and cut-off was supported at the CGPM and the dotation voted accordingly.

Mr Henson reminded the CIPM that the BIPM is only allowed to carry out projects that are identified in the Work Programme. If projects are dropped from the Work Programme they cannot be initiated in the future even if funding were to become available.

The Work Programme has been revised such that the additional projects remain and are clearly marked as 'unfunded projects'; this wording clearly indicates that on current cost estimates they are not expected to be funded from the dotation. It was also recalled that the General Conference called on the Member States and other bodies to continue to support the BIPM with additional resources over and above the dotation. If such additional resources are forthcoming some of these currently unfunded projects could then be supported.

The President thanked Mr Henson and invited comments. It was noted that the minutes of Session II of the 103rd meeting of the CIPM referred to a workshop on accelerator-based dosimetry which was scheduled to have been held at the BIPM in March 2015. It was queried whether this had been postponed and if there were any implications for the Work Programme. It was clarified that the workshop had been postponed due to a change in the Presidency of the Consultative Committee for Ionizing Radiation (CCRI). It was further clarified that there would be no implications for the Work Programme because accelerator-based dosimetry at the BIPM had not been included in the Work Programme, either as a core project or an additional project. A generous offer has been received from a major NMI that might allow the BIPM to continue more of its accelerator-based dosimetry work offsite.

It was recalled that there was a sentence in the minutes of Session II of the 103rd meeting that stated '*the alternative activities [in the Work Programme] have been rejected as there was no consensus to fund them*'. It was noted that this is not the case and they have not been rejected; these projects are simply unfunded and alternative sources of funding are being sought from outside the dotation.

Decision CIPM/104-06 The CIPM approved the BIPM Work Programme for 2016-2019.

11. PLANS FOR THE DEVELOPMENT OF ELEMENTS OF A BIPM VISITOR PROGRAMME ON A CO-FUNDED BASIS

Mr Henson recalled that in addition to the technical Work Programme, a proposal was put forward at the CGPM meeting (2014) for a Visitor Programme aimed at Member States who were developing their metrology systems. There was no consensus at the CGPM to support the additional budget necessary to fund the Visitor Programme, even though the majority of Member States agreed that it was an important project. There was recognition that most of the large technologically-advanced States are already Member States so by definition, any new Member States or Associates will have an emerging metrology infrastructure. Opportunities for such States to participate in the activities of the BIPM are currently limited. In recognition of this, the wording of the final clause in Resolution 4 (2014) was amended to include the following text shown in bold: "*[The General Conference on Weights and Measures (CGPM), at its 25th meeting urges] Member States, as well as international organizations, private organizations and foundations to maintain the provision of additional voluntary support of all kinds to support specific BIPM mission-related activities, particularly those that facilitate participation in the activities of the BIPM by those countries without well-developed metrology infrastructure.*" During the discussions on Resolution 4, a number of Member States indicated that they would be willing to provide additional support to the BIPM in cash or in kind.

Mr Henson reported that the Visitor Programme document, as proposed to the CGPM, has now been revised so that it includes only the essential elements and it has been presented as a series of stand-alone projects. To avoid confusion with the proposal presented at the CGPM it had been renamed the 'BIPM Capacity Building and Knowledge Transfer Programme'. The principle is that the BIPM will work with individual donor States or bodies that will indicate which of the projects from a list they would be able to support. This will allow great flexibility. The Visitor Programme that had been proposed at the CGPM was only intended to be for Member States. Subsequent discussions with potential donors and the RMOs suggested it should be left for individual donors to indicate whether their support would be open to Associates as well as Member States.

Mr Henson reiterated that the CGPM gave a clear endorsement of the concept that the BIPM must remain relevant to all of its Member States.

The President thanked Mr Henson and invited comments. It was noted that the Programme contains references to visits to the BIPM. The word ‘visit’ has certain connotations and it should be made clear that anyone participating in the programme will be expected to work. There was a comment that although the BIPM Capacity Building and Knowledge Transfer Programme will be aimed primarily at States with emerging metrology infrastructure, the concept of knowledge transfer will also be of benefit to many established NMIs.

The President remarked that the CIPM welcomes the initiative for the BIPM Capacity Building and Knowledge Transfer Programme and asked the CIPM to show their support via a show of hands. There was unanimous support.

Decision CIPM/104-07 The CIPM welcomed the proposal from the BIPM for a Capacity Building and Knowledge Transfer Programme and unanimously supports it.

12. CONSIDERATION OF THE ARREARS OF THE ISLAMIC REPUBLIC OF IRAN

The Director updated the CIPM on the situation regarding the arrears of the Islamic Republic of Iran. He gave a brief summary of the background to the situation, which is described in detail in §26 and §27 of the report of Session II of the 103rd meeting of the CIPM in November 2014. By the end of 2014, Iran had paid almost 500 000 € as a contribution and as a rescheduled payment of the arrears for 2013-2014; it was 20 000 € short, which was the cost of bank transfer fees. On 10 February 2015, the Director and Ms Arlen, the head of the BIPM Legal, Administration and Human Resources Office, attended a reception at the Iranian Embassy where they met two new officials who are responsible for the BIPM case. It was clear from this meeting that Iran intends to maintain its membership of the BIPM and it is expected that the good relations will continue. On this basis, the CIPM bureau has been consulted and it was suggested that a case is developed to present to the 26th CGPM meeting about how to take forward the situation with Iran. It was proposed that preparation of the case would start, in consultation with Iran, approximately 18 months before the 26th CGPM meeting which is to be held in 2018

The Director reported a further positive development to the situation that occurred on 9 March 2015. There was evidence from bank transfers that the outstanding 20 000 € has been paid along with an additional 50 000 € for Iran’s membership contribution for 2015. When this money comes through, Iran will have fully honoured the terms of the freezing agreement.

Decision CIPM/104-08 The CIPM supported the proposal from the BIPM regarding the situation of the Islamic Republic of Iran that the BIPM should develop a detailed case one year before the publication of the Convocation for the 26th CGPM (i.e. early in 2017) in order to submit the case to Member States well in advance.

13. UPDATE ON THE EXPECTED DEBATE ON THE FUTURE OF THE “LEAP SECOND” DURING 2015

Dr Arias, Director of the Time Department and Executive Secretary of the CCTF, joined the meeting and was welcomed by the President. She gave an update on the possible redefinition of Coordinated

Universal Time (UTC) and the future of the leap second, which has been under discussion at the International Telecommunication Union (ITU) for fifteen years. The delay in coming to a decision is due to opposition from a few States and the expressed need for more technical information coming from many other States.

The discussions are taking place within the Radiocommunication Sector of the ITU (ITU-R), of which the BIPM is a member. The issue is under the scrutiny of Study Group 7 (SG7, Science services), particularly its Working Party 7A (WP7A, Time signals and frequency standard emissions). Studies were undertaken by WP7A with the aim of evaluating the impact of the leap second insertion on UTC, as established in the Recommendation ITU-R TF.460-6, "Standard-frequency and time-signal emissions". Consultations with member administrations, sector members and relevant international organizations were conducted throughout the period of the discussions.

The redefinition of UTC represents a singular case in the history of the ITU. Consensus is usually reached at the Study Group level, leading to rapid formal approval by the largest forums of the ITU, the Radiocommunication Assemblies and the World Radiocommunication Conferences. But, because of the absence of consensus, the subject is on the Agenda of the next World Radiocommunication Conference (WRC-15) in November 2015 for discussion and a final decision. The BIPM has participated actively in the discussions. The CCTF included the redefinition of UTC as a point for discussion at several successive meetings and has produced opinions that were submitted to the ITU as contributions from the CIPM.

The President thanked Dr Arias on behalf of the CIPM for her very clear report and the update on developments. He noted that the CIPM awaits further developments with interest. Dr Arias left the meeting.

14. REVIEW OF THE 25TH CGPM AND ACTIONS ARISING FROM THE RESOLUTIONS

The Director commented that the intention of the agenda item was for the CIPM to reflect on the 25th CGPM meeting. He opened the floor for comments, starting with the resolutions.

Resolution 1: 'On the future revision of the International System of Units, the SI'

Prof. Ullrich recalled Decision CIPM/103-30 taken at the previous meeting of the CIPM in which *'the CIPM supported the proposal of CODATA to set a deadline of 1 July 2017 for submission of experimental data to be used by the CODATA Task Group on Fundamental Constants in the evaluation of the fundamental constants which will lead to the fixed values for the defining constants of the new SI.'* He commented that this is inconsistent with CODATA which states that *'the new results for the conclusion of this adjustment must be accepted for publication by 1 July 2017.'* Prof. Ullrich also noted that even if something is accepted for publication the numbers may change during proofreading although this is undesirable. He commented that as a result of the inconsistencies there had been a discussion among the principal researchers running the experiments to clarify the situation. It was concluded that data required for consideration by CODATA should be published by 1 July 2017. He asked if this approach could be endorsed by the CIPM.

There was a brief discussion on whether the deadline of 1 July 2017 should apply to the acceptance of experimental results for publication or the actual publication of results. There were opposing views but the general consensus was that experimental results to be used by the CODATA Task Group on

Fundamental Constants in the evaluation of the fundamental constants leading to the fixed values for the defining constants of the new SI should be **accepted for publication** by 1 July 2017.

Decision CIPM/104-09 The CIPM revised its Decision CIPM/103-30 and decided that experimental results to be used by the CODATA Task Group on Fundamental Constants in the evaluation of the fundamental constants leading to the fixed values for the defining constants of the new SI should be accepted for publication by 1 July 2017.

Prof. Ullrich continued by presenting the paper '*Proposal for the establishment of a task group under the auspices of the CIPM to reflect on a world-wide awareness campaign concerning the new SI*'. The proposal addresses the needs expressed at the 25th CGPM for an awareness campaign for the new SI. It is proposed that the task group should include public relations (PR) experts from selected NMIs, a member of the CCU and a member of the CIPM. Prof. Ullrich invited comments.

Dr May suggested that in addition to focusing on the new SI, the awareness campaign should cover how metrology is involved in contemporary societal issues, for example how metrology can improve the quality of life and how the new SI will be implicated. Dr Richard commented that there should be a mechanism in place to ensure good communication between the task group and the Consultative Committees. Prof. Ullrich agreed with these comments and particularly noted that the CCs will be kept informed of any new developments and will ensure that any technical information is verified. The geographic spread of the proposed NMI representation on the task group was queried; it was suggested that all regions should be represented. There was a general consensus that the work towards the awareness campaign should get under way as soon as possible.

With regard to awareness campaigns, Dr May gave a brief summary of the forthcoming CCQM Symposium during the American Chemical Society (ACS) National Meeting in Boston, Massachusetts, on 16-20 August 2015. The symposium will explain the redefinitions of the SI to the chemical community and will consist of two sessions. The first will cover the importance and role of the mole and the kilogram in chemical and biological measurements and CIPM activities to redefine the mole and kilogram. The second session will be more practical and will cover the CCQM and its activities to assess and improve the equivalence of national standards for chemical and biological measurements.

Dr Rietveld commented that the CCEM set up the Working Group on Proposed Modification to the SI (WGSI) in 2013 to keep its stakeholders informed about the impact of the new SI. This Working Group has already had some positive outcomes including a presentation at the NCSLI and a paper in the NCSLI journal, *Measure*. He asked if these activities should continue within the CCEM and at the CC level or if they should be merged with the proposed task group. Prof. Ullrich replied that in specialist areas such as the CCEM, it should continue to be the responsibility of each CC to keep its stakeholders informed. The task group is more concerned with an awareness campaign for the general public and non-specialists.

Dr May added that the target groups for the awareness campaign should include scientific society meetings.

The President of the CIPM closed the discussion by noting that there is support in principle for the awareness campaign and he suggested that as a starting point, PR experts from NMIs that had expressed an interest should be contacted to participate in the meeting. He added that the intention is to limit the size of the Working Group to six people for the initial meeting. Additional experts from other NMIs such as the VNIIM, as proposed by Dr Bulygin, can be added subsequently when the *modus operandi* of the programme has been established. Prof. Ullrich will organize the initial meeting.

Decision CIPM/104-10 The CIPM approved the proposal made by the CCU President to start an awareness campaign relating to the new SI and requested him to contact KRISS, LNE, NIST, NMIJ, NPL and PTB to ask them to nominate experts in public relations to take part in a working group.

Resolution 2: 'On the election of the CIPM'

The Director commented that the outgoing CIPM Secretary had reported on the election of the Committee for CIPM Election (CEC) Chair, Dr Weritz, (see Appendix 1) and that the new CIPM Secretary will remain in regular contact with her to keep her informed of the work required from the CEC. The President noted that Dr Weritz had asked for feedback on the result of the bureau elections.

Decision CIPM/104-11 The CIPM Secretary will contact the chair of the CGPM Commission for CIPM Election, Dr Weritz, to inform her about the results of the election of the CIPM bureau.

Resolution 3: 'On the Pension and Provident Fund of the BIPM'

There were no comments.

Resolution 4: 'Dotation of the BIPM for the years 2016 to 2019'

There were no comments.

Resolution 5: 'On the importance of the CIPM Mutual Recognition Arrangement'

A paper has been prepared that will be discussed later in the agenda (see §23).

15. REPORT FROM THE CHAIR OF THE CIPM AD HOC WORKING GROUP ON CONDITIONS OF EMPLOYMENT

Dr McLaren reported that the Working Group has completed its study of salaries at the BIPM and compared them with comparable organizations. It will now begin to look at the salary structure at the BIPM, including mechanisms for annual increments and merit increases. In addition it will look at other elements of the conditions of employment including healthcare benefits and various allowances in collaboration with the CIPM Sub-Committee on the BIPM Pension and Provident Fund and Health Insurance. The Chairman has had a preliminary meeting with the Director to determine the future plans for the BIPM salary structure. As a result, the Working Group will consider the development of generic job descriptions.

The Director commented that he has received support from several NMIs which will allow the BIPM to ensure that it is in step with best practice in the NMIs.

The President thanked Dr McLaren and closed the second session of the first day of the meeting.

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The President welcomed the CIPM to the second day of its meeting. He recalled that Dr Kaarls had left the CIPM after 21 years of service. He proposed that Dr Kaarls be appointed as an honorary member of the CIPM. Dr May supported the proposal and commented that he has been a long term and steadfast contributor to both the CIPM and world-wide metrology. He opined that this will be well accepted by the international community of metrologists. The President asked for a vote and there was unanimous support.

Decision CIPM/104-12 The CIPM appointed Dr Kaarls as an honorary member of the CIPM for his outstanding contribution to the CIPM. The President of the CIPM will inform Dr Kaarls of this appointment.

16. REPORT ON COORDINATION AND LIAISON AT THE BIPM

Mr Henson began by presenting the poster for World Metrology Day 2015, the theme of which is ‘Measurements and light’. He thanked NMISA (South Africa) for their support in the design of the poster.

He recalled that the Secretary had already spoken about the exclusions of the Dominican Republic and Sri Lanka and that the Republic of Azerbaijan had become an Associate (see Appendix 1). He updated the CIPM on the situation with the Associates of the CGPM that are on the ‘escalator’ (see Resolution 4 of the CGPM (2011)). As of March 2015, 19 Associates have been formally encouraged to become Member States. So far, none of these have decided to become a Member State, although a small number have made enquiries.

Within the GULFMET initiative, Saudi Arabia is a Member State and Yemen and Oman are Associates. The remaining four States within GULFMET (United Arab Emirates, Bahrain, Qatar and Kuwait) may become Member States or Associates in 2015.

Kosovo has made preliminary enquiries about becoming an Associate in the future. If a formal application is received it will require careful consideration because Kosovo is in a unique situation within the international community.

Mr Henson commented that he will lecture at the five-day workshop on ‘Trade Capacity Building Training for Least Developed Countries (LDCs)’ in Maputo, Mozambique, from 24-28 March 2015. The workshop was organized by the United Nations Industrial Development Organization (UNIDO) with support from the DCMAS Network. Attendees at the workshop are required take part in an online assessment before they can be considered for participation. There is an initiative from some partners within the DCMAS network to change its name to the DCQI Network (Network on Quality Infrastructure in Developing Countries) to better reflect the conformity assessment aspects, but it was not clear if there would be consensus. The chair of the DCMAS Network rotates every year and the current chair has approached the BIPM about taking on the responsibility. He commented that this ties in well with the BIPM Capacity Building and Knowledge Transfer Programme (see §11).

Other coordination activities have been covered in the Secretary’s Report (see Appendix 1) or will be covered later in the agenda.

The President thanked Mr Henson and invited questions.

Dr Bowsher asked if there would be any benefits to encouraging stronger links between the BIPM and the International Organization of Legal Metrology (OIML) with the ultimate aim of creating one organization to represent metrology. The Director commented that he strongly agreed with this suggestion and opined that a single voice for world metrology would be highly desirable. The work of both organizations is complementary and there would be organizational benefits to working much closer. The President and Dr Quinn recalled the history of past attempts at a rapprochement and there was general support for the suggestion made by Dr Bowsher.

17. CIPM POSITIONS ON REVISIONS OF ISO/IEC 17025 AND ISO GUIDE 34

ISO/IEC 17025

Mr Henson presented Document CIPM/15-04 '*CIPM Position on revision of ISO/IEC 17025 – Draft for discussion*'. A proposed position has been developed in collaboration with the Director, Dr Kaarls and the CIPM bureau so that when Mr Henson attends the ISO Working Group on the revision of ISO/IEC 17025 he can speak with the authority of the CIPM. The document identifies three key principles that form the major components of the CIPM position:

- To maintain the principle of traceability to the SI (or other international standards, when that is not yet possible);
- To avoid calibration being classed as a “conformity assessment activity” *per se*;
- To position the CIPM MRA, which is not referenced in the current version of ISO/IEC 17025, as providing ‘a presumption of compliance’ with regard to recognition of traceability; this could be achieved through a non-normative reference.

He commented that it has already been necessary to defend rigorously one of these principles to stop calibration being identified as a formal ‘conformity assessment activity’ *per se*. He noted that the ISO Secretariat has been very sympathetic to the views of the BIPM and that when he speaks at the ISO Working Group it is important that he has a clear mandate from the CIPM to the key points.

The Director added that position papers are part of a more systematic approach to the BIPM’s liaison work. He commented that it is a mode of operation that the BIPM would like to carry on with: a position will be brought to the CIPM for agreement, and then afterwards the appropriate BIPM representative will have clear guidance and be able to point to the CIPM position in such fora.

The President thanked Mr Henson and asked if the CIPM agreed with Document CIPM/15-04 outlining the CIPM position with regard to the revision of ISO/IEC 17025. He asked if there were any other items that should be included. There was a brief discussion on the position paper and it was supported as presented. Mr Henson noted that the paper is not intended for circulation to the ISO Working Group; he will use it to clarify the CIPM position.

Decision CIPM/104-13 The CIPM adopted the position proposed in Document CIPM/15-04 on the revision of ISO/IEC 17025 as the CIPM position.

Mr Henson added that the BIPM is not part of the working group on the revision of ISO 17011 ‘conformity assessment bodies’. However, there is a proposed revision to this standard that could cause problems for the BIPM. At the moment the standard identifies calibration as a conformity assessment activity, but qualifies this with a note ‘for the purpose of this standard’. This qualification is proposed for deletion in the latest revision of the document. Following discussions with the bureau, it was agreed that

the BIPM should intervene directly with the ISO Secretariat to advise them that we would prefer the qualification to remain in the standard such that it remains consistent with the position adopted in Resolution 11 of the 22nd CGPM (2003) which notes that calibration is not a conformity assessment activity. The CGPM resolution will be quoted as the basis for this position.

ISO GUIDE 34

The Director presented Document CIPM/15-11 '*CIPM Position on ISO 17034 1st CD and Guide 35:2014 2nd CD – Draft for discussion*' and gave the background to implementation of the guide at the BIPM. ISO Guide 34 refers to the preparation of reference materials. In the course of implementing the CIPM MRA in the field of chemistry, it became clear that the requirement for quality systems consistent with ISO 17025 was not sufficient to ensure that the reference material components in the CMCs were properly covered. It was proposed to the CCQM that implementing the CIPM MRA would require NMIs to work to the standards ISO/IEC 17025 and ISO Guide 34. Today, ISO CASCO sees the wide use of ISO Guide 34 and they want to incorporate it into their system as a standard (ISO 17034). This would also meet requirements in some regions where having the status of a 'guide' has prevented some legislators and regulators from referring to it. ISO Guide 34 is very important in the chemistry area and has some relevance in ionizing radiation where there are reference material activities. Dr Westwood (BIPM Chemistry Department) has been nominated to take part in the joint ISO REMCO/CASCO Working Group to develop the standard ISO 17034 for the production of reference materials based on ISO Guide 34. Dr McLaren volunteered to work with Dr Westwood.

A position has been developed (Document CIPM/15-11) that includes three points that should be the major components of the CIPM position:

- To maintain the existing normative reference to the VIM and use of VIM definitions.
- To emphasize the use of demonstrated method performance, measurement uncertainty and metrological traceability in criteria used to select methods for reference material value assignment.
- To broaden the current criterion for value assignment of a CRM for a method-defined measurand to permit "characterization of a method-defined measurand using one or more laboratories with demonstrated competence."

The President thanked the Director. There were no comments and the CIPM adopted the position proposed in Document CIPM/15-11.

Decision CIPM/104-14 The CIPM adopted the position proposed in Document CIPM/15-11 on the drafting of ISO 17034 as the CIPM position.

18. CIPM STRATEGY AND OBJECTIVES

The Director presented Document CIPM/15-17 '*Five questions outstanding from the development of the BIPM Long Term Strategy in 2014*'. He gave a summary of the development of the BIPM's long-term strategy as set out in the '*BIPM Strategic Plan (2014)*'. He recalled that the document had been circulated widely for comment and review. Several comments made by CIPM members had raised 'larger issues'. These questions can now be grouped into five headings for discussion.

Question 1. *What is the CIPM's strategy for developing its relationship with the RMOs?*

The background to this question is that the Metre Convention makes no reference to the regional metrology organizations (RMOs). The RMOs play a central role in the implementation of the CIPM MRA and at present, the distribution of Member States across the RMOs is highly uneven. There were three topics for discussion.

How does the CIPM wish to develop its relationship with the RMOs?

The Director opened the floor. Prof. Brandi commented that there is no formal relationship between the BIPM, CIPM and the RMOs. He observed that if it is not possible to include the RMOs in the Metre Convention, a method should be found to bring the RMOs closer to the activities of the BIPM, rather than simply relying on the work of the Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB). He did not consider the link between the BIPM and the RMOs via the JCRB to be very strong. The President commented that in 2013-2014 the RMO Chairpersons were invited to attend the meeting of NMI Directors and Member State Representatives as a way of engaging with them more fully. He suggested that one way of addressing Prof. Brandi's concerns would be to organize a meeting between the RMO Chairpersons and the CIPM or the CIPM bureau.

Dr Liew spoke from the perspective of the APMP. He noted that many activities within the APMP reflect the work of the BIPM, for example the harmonization of scientific measurement standards, and he supported the comments of Prof. Brandi that a more formal link is required than the current arrangement through the JCRB. The President suggested that a Memorandum of Understanding (MoU) could be signed between the RMOs and the BIPM. He added that the areas where closer links are proposed should be specified to set objectives for what we are trying to achieve through closer links with the RMOs. Dr Quinn commented that the Metre Convention can be considered as an enabling agreement under which the CIPM can establish individual MoUs, without any modification of the treaty.

Dr Bowsher opined that the CIPM's principal access to the RMOs is through the Member States and this relationship should be maintained. The RMOs have a beneficial role at the regional level which works well, however the way they work varies from region to region and the needs of individual RMOs are very different. The balance is right in the CIPM MRA and this is where the RMOs have been able to provide coordinated input from a region, adding value to the work of the NMIs. He cautioned against formalizing a different set of relationships with the RMOs which work well for the needs of their own areas.

Mr Énard suggested turning the question around and asking the RMOs how they want to develop their relationship with the CIPM. He commented that not all RMOs contribute fully at meetings of the JCRB and suggested that the terms of reference of the JCRB could be amended to increase the involvement of the RMOs.

Dr May commented that there is the possibility of a mutually beneficial relationship between the CIPM and the RMOs. The CIPM is considered to represent the highest level of metrology and much collaborative work is carried out to achieve this. With the advent of the CIPM MRA, another need was created; the RMO structure was charged with supporting the CIPM MRA in the various regions. In doing so, it was found that there were training needs that not every state or economy was able to meet. As a result, he suggested that a relationship between the BIPM and the RMOs might be built around knowledge transfer and capacity building in the regions.

Prof. Ullrich suggested holding a high-level meeting between the RMO representatives and the CIPM bureau at the same time as the meeting of NMI Directors and Member State Representatives as a first step. The different views and questions could then be discussed at a future CIPM meeting. The expectations of both sides regarding what form of relationship is required could then be determined.

A regular exchange at a high level would be a good starting point. The President agreed with this suggestion.

Dr Rietveld commented that the RMOs play an important role in the CCs in which he is involved and he could not see any problems with the existing relationship or any advantage to a more formal relationship. He added that he appreciates the different visions and perspectives that are contributed by the individual RMOs at CC meetings. The President agreed that the interactions at the CC level are essential, although this is at a technical level.

The President drew the discussion to a close by commenting that the suggestion by Prof. Ullrich for a high-level meeting between the RMO representatives and the CIPM bureau should be explored as a starting point.

Decision CIPM/104-15 The CIPM requested the CIPM bureau to convene a meeting with the Regional Metrology Organization Chairs and to report back.

Should the CIPM support some acceleration in the development of GULFMET?

Mr Henson commented that the pivotal issue for GULFMET becoming recognized, or provisionally recognized, as an RMO within the meaning of the CIPM MRA is a set of conditions that requires participation in a CC. The metrology institutes in the Gulf region mainly carry out calibrations rather than research. GULFMET only has one Member State of the BIPM and two Associates of the General Conference within its membership. It has an advanced structure with Working Groups and Technical Committees and has expanded its expertise by taking on five Associates: IMBiH, Bosnia Herzegovina; NIS, Egypt; SCL, Hong Kong; KRISS, Republic of Korea; and UME, Turkey to strengthen its presence in the Working Groups of the Consultative Committees of the CIPM. It has also started two significant comparisons. The CIPM's view is sought on whether more should be done to help with the development of GULFMET. The CIPM MRA is concerned with the delivery of services and a requirement to be a member of a CC is about research capability. The President opined that there is not much the CIPM could do to accelerate the development of GULFMET to a level of participation in the CCs but a representative could be invited to the JCRB as an observer.

The Director commented that the aim is to have an effective set of RMOs that cover the globe. The vehicle for relating to the RMOs is the JCRB but because the JCRB is an operational body concerned with the implementation of the CIPM MRA, it sets standards for engaging with GULFMET that are concerned with operational issues in the CIPM MRA. These are not the same as the interests of the Metre Convention, which works towards the global comparability of measurements in every region. This is a reminder of why there is a need to develop the way in which these relationships are conducted. The President asked if it is possible for GULFMET to attend JCRB meetings as an observer, the Director replied that the JCRB could be asked to look into this.

After a brief discussion it was agreed that the JCRB should be encouraged to look into ways that would allow GULFMET to attend its future meetings.

Decision CIPM/104-16 The CIPM encouraged the JCRB to explore mechanisms by which GULFMET could attend future JCRB meetings.

Does the CIPM have any plans to support the Member States that are not members of any RMO?

The Director commented that if there is an intention to enter into more formal relations with the RMOs, there could be a future problem with States that do not adhere to an RMO. Such States could become Associate members of an RMO but that would not give them voting rights within that RMO. There was a brief discussion and it was agreed that this is an issue for discussion in the future.

Question 2. What is the CIPM's strategy for developing its accountability mechanism with the NMIs and their directors?

The background to this question is that the Metre Convention establishes the relationship between the BIPM and its Member States. However, it also states that “*The CIPM directs all metrological work the High Contracting parties shall decide to have carried out in common*” (AR art 10); this was the basis for establishing the CIPM MRA. A meeting of NMI Directors and Member State Representatives was instituted largely to address the implementation of the CIPM MRA. Subsequently, it received reports from the CIPM following the work of the *ad hoc* Working Group established in 2011. The meeting of NMI Directors and Member State Representatives has no formal role in the governance of the BIPM. There were two topics for discussion.

How does the CIPM plan to develop its relationship with the NMI Directors and Member State Representatives?

What items should appear on the agenda of future meetings?

The President commented that it was accepted at the 25th CGPM meeting that future CGPM meetings could return to a four-year cycle as long as there is regular accountability back to the meeting of NMI Directors and Member State Representatives.

Prof. Ullrich suggested that the NMI Directors and Member State Representatives should organize their own meetings and there should be an agenda item to allow them to be updated by the Director or a member of the CIPM bureau on the work of the CIPM and BIPM.

Dr May opined that the BIPM should act as host and facilitator for meetings of NMI Directors and Member State Representatives. The topics for discussion at these meetings could be at the discretion of the attendees. He added that the meetings may require an extra half day or full day where the BIPM or CIPM could set the agenda to share information with the NMI Directors and Member State Representatives.

Dr Bowsher agreed with Dr May and proposed that the NMI Directors should come up with the topics they want to address on one day of their meeting and a second day should be set aside for updating primarily the Member State Representatives on progress that has been made between meetings of the CGPM. This would lead to a more targeted meeting. The President followed up this suggestion by proposing that the Chairperson of the meeting could come from among the NMI Directors. This would emphasize that it is their meeting. The Director commented that this is a welcome idea and that the BIPM would be pleased to host such a meeting. However, he noted that the Directors of the largest NMIs already attend the CIPM meeting and that they were elected by the Member States to do so. He reminded the CIPM that there are 220 NMIs and DIs that would need to be contacted if it is suggested that the NMI Directors should be consulted to set the agenda.

Mr Henson commented that in 2011 the NMI Directors and the Member States were unhappy with the governance of the BIPM on the run up to the 24th CGPM and they took a much greater role in driving the agenda at that meeting, which was originally focused around the CIPM MRA. Since then they have elected a newly refreshed CIPM. He commented that it is wrong to have two bodies directing the BIPM. The BIPM should answer to the CIPM, not the meeting of NMI Directors and Member State Representatives.

Dr May commented that the proposal is not for a collection of NMI Directors that would tell the BIPM what to do. It would meet to discuss any metrological challenges for the future. The meeting could be held anywhere, but he had suggested the BIPM as a location as it is centrally located. It would be up to the NMI Directors to set the agenda. The President noted that such a meeting would still need to be organized to coordinate the input from the NMI Directors and it may require one of them to do this.

Dr Bowsher commented that in the past an agenda has been produced, to which any extra items were added. The proposal now is that there would be a separate meeting of NMI Directors, whereby they would be able to discuss issues of concern to themselves, separate to the BIPM and CIPM. This would require some organization and leadership.

Dr McLaren observed that the meeting of NMI Directors and Member State Representatives is attended by both communities. When the agenda is developed for the meeting, should the topics be of interest to both communities or would it be more appropriate to address specific topics to the individual communities? The President noted that when it comes to accountability and feedback from the BIPM, the Member State Representatives need to be in attendance. For more technical issues, the NMI Directors should be involved.

Dr May added that the current format of the meeting of NMI Directors and Member State Representatives, as organized by the CIPM and BIPM, is intended to share information with the stakeholders. The proposal here is for an additional meeting for NMI Directors to get together to discuss anything they like as there are few opportunities for them to meet up to discuss ideas and concerns outside of the meeting held at the BIPM. They would control the agenda and would discuss the logistics; the BIPM would simply be asked to host the meeting. The President commented that the next meeting of NMI Directors and Member State Representatives in October has already been fixed and will discuss the review of the CIPM MRA. He added that issues on the agenda for 2015 were driven by concerns expressed by the NMI Directors.

The CIPM was reminded that the discussion had focused on NMI Directors. It should not be forgotten that the Member State Representatives had requested in 2011 a ‘mini’ CGPM meeting every two years to be kept up-to-date with what is happening at the BIPM.

In terms of practical implementation of the proposed meeting of NMI Directors, Prof. Ullrich suggested that the NMI Directors around the table should take the lead and contact the others in order to get their views on what they would like on the agenda for a proposed meeting in 2016.

Questions 3 and 4 were tabled in anticipation of a discussion at the next Session of the CIPM in October 2015:

Question 3. *What is CIPM’s strategy towards the expansion of the BIPM to include more Member States?*

Question 4. *How does CIPM plan to develop its role in the Global Quality/Technical Infrastructure?*

Question 5. *How does the CIPM plan to identify “Grand Challenges” for global metrology?*

There was a brief debate on the question 5. Dr Bowsher stated that he would welcome a more open discussion at each CIPM meeting on cross-cutting topics. He suggested that one approach to the question would be to consider the hypothetical situation ‘*if you were setting up the CIPM now, what would its strategy be and what areas would it focus on to address the needs of metrology*’. Many issues cut across the remit of different CCs and he commented that the external speakers at the CGPM meeting raised many interesting issues.

Dr May suggested rewording question 5 to ‘How does the CIPM react to “Grand Measurement Challenges” for global metrology. This highlights the need for the CIPM to react and add value to challenges as they come up.

Dr Liew asked how the CIPM plans to identify the challenges and if there is a mechanism in place to understand foresight about metrological subject areas that are changing. The CC strategies go some way towards this but how is information such as foresight trends collected from other communities. He suggested that useful data could be obtained by holding workshops with other communities, for example industry. The Director replied that workshops are held regularly at the BIPM, for example the BIPM workshop on Global to Urban Scale Carbon Measurements in June 2015. Stakeholders are invited to attend and will make most of the presentations. Workshops represent a deliberate attempt to raise the level of debate on particular issues between the NMIs, the metrology community and stakeholders in that community. He commented that suggestions for topics for future workshops are welcome.

Dr Louw suggested that cross-cutting challenges could be identified by encouraging more interaction between the CCs. The CCs know about the measurement challenges within their areas and this information should be shared. The President added that a meeting of CC Presidents had been held in 2014; this had been a valuable exercise that should be repeated.

Dr May noted that there are challenges that are not captured by the existing CC structure, for example cyber security, quantum science and big data. These are subjects that could be discussed at the proposed meetings of NMI Directors. He opined that if we adhere to the narrow definition of metrology, some of these challenges could be missed. The President noted that this comes back to the point that we should engage with a wider and higher-level community.

Prof. Brandi commented that the grand challenges of measurements for climate and global healthcare are well known and we should focus on one or two measurements within these areas rather than looking for more challenges.

The President summarized the discussion by noting that many important issues had been discussed. The CIPM would return to the subject at its next session.

19. PRESIDENCY OF THE CONSULTATIVE COMMITTEES

The President commented that Dr Sacconi had stepped down as the President of the Consultative Committee for Length (CCL). He proposed Prof. Inguscio as the new President. There were no objections and Prof. Inguscio was appointed. It was recommended that he should meet with key participants in the CCL to familiarize himself with its activities before its next meeting in September 2015.

Decision CIPM/104-17 The CIPM appointed Prof. Inguscio as the new President of the Consultative Committee for Length (CCL) for a 4-year term and encouraged Prof. Inguscio to make contact with key participants in the CCL for preliminary discussions.

The President of the CIPM noted that he has been President of the Consultative Committee for Electricity and Magnetism (CEM) for 12 years and has decided step down. He recommended to the CIPM that Dr Rietveld should be appointed as the new President. There were no objections and Dr Rietveld was appointed.

Decision CIPM/104-18 The CIPM appointed Dr Rietveld as the new President of the Consultative Committee for Electricity and Magnetism (CEM) for a 4-year term.

The Presidents of the other Consultative Committees indicated that they are prepared to continue in the roles. Dr Usuda agreed to act as the President of both the CCAUV and the CCPR. This arrangement will

continue until the next meeting of the CCPR in 2016 when the situation will be reviewed. He added that his acceptance of the CCPR position is subject to the approval of his involvement by the NMIJ.

Decision CIPM/104-19 The CIPM reappointed the Presidents of the following Consultative Committees for 4-year terms:

- Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV): T. Usuda.
- Consultative Committee for Mass and Related Quantities (CCM): P. Richard.
- Consultative Committee for Photometry and Radiometry (CCPR): T. Usuda (on the condition of receiving approval for his involvement from the NMIJ).
- Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM): W.E. May.
- Consultative Committee for Ionizing Radiation (CCRI): W. Louw.
- Consultative Committee for Thermometry (CCT): Y. Duan.
- Consultative Committee for Time and Frequency (CCTF): L. Énard.
- Consultative Committee for Units (CCU): J. Ullrich.

20. CHAIRMANSHIP AND MEMBERSHIP OF CIPM SUB-COMMITTEES AND AD HOC WORKING GROUPS

The President commented that the CIPM *ad hoc* Working Group on CIPM Membership has completed its tasks and as a result has been closed. He thanked Dr May for chairing the Working Group and all of its members for their hard work.

Decision CIPM/104-20 The CIPM decided to close the CIPM *ad hoc* Working Group on CIPM Membership and thanked Dr May and his Group for their work.

There was a discussion on the vacancies in the existing Sub-Committees and *ad hoc* Working Groups following the election of the CIPM in November 2014 and the membership of the new CIPM Sub-Committee on Awards and the CIPM *ad hoc* Working Group on the CIPM MRA. The results were as follows:

Decision CIPM/104-21 The CIPM appointed the following CIPM members to serve on the CIPM Sub-Committees and *ad hoc* Working Groups:

- CIPM Sub-Committee on Strategy: M. Milton (Chair), CIPM bureau, H. Brandi, G. Rietveld, T. Liew.
- CIPM Sub-Committee on the BIPM Pension and Provident Fund and Health Insurance: L. Énard (Chair), T. Usuda, B. Bowsher, C. Bock (external member).
- CIPM Sub-Committee on Finance: B. Bowsher (Chair), Y. Duan, J. McLaren, P. Richard, W. Louw.
- CIPM *ad hoc* Working Group on Conditions of Employment: J. McLaren (Chair), L. Énard, I. Castelazo, M. Buzoianu.
- CIPM Sub-Committee on Awards: M. Inguscio (Chair), D.-I. Kang, H. Brandi, F. Bulygin.

- CIPM *ad hoc* Working Group on the CIPM MRA: B. Inglis (Chair), W.E. May, J. Ullrich, F. Bulygin, T. Usuda, W. Louw, M. Milton, L. Érard.

21. CIPM REPRESENTATION ON EXTERNAL BODIES

CIPM representation on the following external bodies was agreed.

- Joint Committee for Traceability in Laboratory Medicine (JCTLM): Dr Kaarls will continue in the role until the Executive meeting in December 2015. Dr May will take over following this meeting.
- Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB): Dr McLaren.
- JCGM Working Group on the International Vocabulary of Basic and General Terms in Metrology (VIM) (JCGM WG2): Dr Buzoianu.

Decision CIPM/104-22 The CIPM proposed Dr Buzoianu to represent the CIPM at the JCGM WG2 (VIM).

- ISO Working Group on the revision of ISO/IEC 17025: Dr Kaarls will act as the link between Mr Henson and meetings of the Working Group. (see §17)
- ISO REMCO/CASCO Working Group to develop the standard ISO 17034: Dr McLaren will act as the link between Mr Henson and meetings of the Working Group. (see §17)

22. REPORT FROM THE JCRB

The report of the 32nd meeting of the JCRB was presented by Mr Henson. The meeting was held at the BIPM on 26-27 March 2014. This report had not been presented to the CIPM in November 2014 due to the workload associated with the CGPM and because there had been no JCRB decisions requiring approval by the CIPM. The JCRB did not hold a meeting in September 2014, again because of the CGPM preparations.

The BIPM Quality Management System (QMS) was reviewed by the JCRB at its meeting. Following the meeting, it was presented at the EURAMET TC-Quality meeting in April 2014, where an expression of confidence in the BIPM QMS was given.

Several aspects of the CIPM MRA review were discussed at the JCRB.

- A EURAMET working group has focused on the review of the CIPM MRA and drafted a paper '*Towards a sustainable CIPM MRA*'. The Technical Committee on Interdisciplinary Metrology (TC-IM) of EURAMET has produced a more detailed paper '*Making the CIPM MRA sustainable: MRA Phase II*'.
- It was decided that each RMO would nominate an official representative to the NMI Directors workshop on the CIPM MRA review scheduled for October 2015. In preparation for discussion of this topic at the 33rd JCRB in March 2015, RMOs were tasked with highlighting practical ideas for improvements in the operation of activities falling within the JCRB.

An updated draft of the paper '*Role of DIs within the CIPM MRA*' was presented by EURAMET. Subsequently, there was an action on the BIPM to produce a more generalized version of the EURAMET paper for wider use by other RMOs and for possible adoption by the JCRB. This will be presented to the JCRB in March 2015.

23. REVIEW OF THE CIPM MRA

Mr Henson presented the paper '*CIPM MRA Review – State of Play summary, February 2015*'. He started by recalling that the meeting of NMI Directors and Member State Representatives in October 2013 concluded that 'there is a need to review the effectiveness and efficiency of the CIPM MRA'. Since then, there has been a considerable amount of work towards this objective, leading to Resolution 5 of the CGPM (2014) '*On the importance of the CIPM Mutual Recognition Arrangement*'. This Resolution mentioned the workshop planned for October 2015 that will engage in a broad discussion of the CIPM MRA and lead to the establishment of a working group to review its implementation and operation.

In March 2014 the JCRB asked the RMOs to consider their opinions on the CIPM MRA which will be collated and presented under the following headings at the October workshop:

- The continued suitability for purpose of the CIPM MRA (does it address the needs?)
- Opportunities to simplify the overall system
- Opportunities to improve the efficiency of the processes, procedures and tools.

Mr Henson presented the draft agenda for the workshop. The agenda was developed in association with the CIPM bureau and includes a NMI Director's panel, a CC panel and a RMO panel. A panel approach was suggested to cope with the large number of potential presentations. He commented that the Resolution called for input from users of the CIPM MRA to give their perspective. This will include bodies such as the International Laboratory Accreditation Cooperation (ILAC) and industrial users.

Consideration needs to be given to the composition of the Working Group, as referred to in Resolution 5 (2014), and some early reflections on expectations and timescales for its work. A number of potential members were identified and discussed, noting that the formal decision will be taken at the workshop.

Mr Henson asked the CC Presidents if they were establishing the position of their CCs with regard to the responsibilities of the CCs under the CIPM MRA. There was general agreement that this is under way.

Dr May commented that the NMI Directors must have a voice at their meeting in October 2015 because they sign the CIPM MRA, not the RMOs. Mr Henson agreed and simply commented that point was that the RMOs will be asked for their input ahead of the meeting so that it can be analysed in advance. Dr Louw added that the RMOs should be informed at the next meeting of the JCRB on 18-19 March that they need to consult as widely as possible when developing their contributions and particularly with the major NMIs in their region. He agreed that the NMI Directors must have a voice at the meeting. Mr Henson commented that the expectation is that the RMOs will have consulted with the NMIs in arriving at their views, but asked whether the BIPM should write directly to the NMI Directors to obtain their input for the meeting. There was a brief discussion over the sequence of events and it was agreed that the NMI Directors should be contacted for their input ahead of the October workshop on the CIPM MRA review to invite their contributions and participation.

Decision CIPM/104-23 The CIPM requested the BIPM to contact all the NMI Directors to invite contributions and their participation in the workshop on the CIPM MRA review planned for October 2015.

Decision CIPM/104-24 The CIPM requested the Consultative Committee Presidents to provide suggestions for participants in the users/stakeholders panel at the workshop on the CIPM MRA review, by 30 April 2015.

24. FUTURE BIPM WORKSHOPS

BIPM Workshop on Measurement Uncertainty: 15-16 June 2015

This workshop is mainly concerned with views on the proposed new GUM but will also look into new areas that the GUM does not address.

BIPM workshop on Global to Urban Scale Carbon Measurements: 30 June-1 July 2015

This workshop will focus on the successful engagement of the CCs with the World Meteorological Organization (WMO) in terms of chemistry, temperature and radiometry. It will include a session on the 'megacities' initiative and a parallel session on carbon measurement that will bring in representatives from the Organisation for Economic Co-operation and Development (OECD) and consultants that are concerned with valuing carbon.

Challenges in materials metrology (BIPM/VAMAS): 2016

A consultation exercise has started with VAMAS for a workshop in 2016, provisionally titled 'Challenges in materials metrology'. A steering group has been set up which includes Wolfgang Unger, BAM and CCQM; Michael Fasolka, NIST; Graham Sims, NPL; and Toshi Fujimoto, NMIJ. Dr Kang volunteered to take part.

BIPM/Varenna Metrology Summer School: 26 June-6 July 2016

The joint directors of the Varenna Metrology Summer School, Italy, are Prof. Inguscio and Dr Milton. The twelve day summer school will be divided into three sessions covering: themes in physical metrology; common issues across the whole of metrology; and metrology for quality of life and chemical metrology. Students will be able to choose to attend all or part of the Summer School.

Other workshops for 2016 and 2017

Quantum Metrology (2017)

A BIPM workshop on the expanding role of quantum metrology is proposed for 2017. It would cover quantum science in metrology, not just applied to electrical measurements, but also cryptography and applications in photometry and photonics. It was suggested that quantum information should be included. The Director encouraged any volunteers from the CIPM to assist in the development of the workshop.

BIPM Summer School (2017)

A BIPM Summer School is planned for 2017 as part of the BIPM Capacity Building and Knowledge Transfer Programme. It will differ from former BIPM Summer Schools as it will be aimed at benefitting individuals from NMIs from Member States with emerging measurement systems. It will cover practical issues of broad interest to individuals from such States. It is proposed that it will be funded by

approaching established NMIs to see if they would be prepared to sponsor a student, possibly one that is already at their NMI and who would benefit from attending.

25. BIPM TERMINOLOGY

The President referred to the Secretary's report which included a summary of the discussions in the CIPM bureau on the subject of terminology (see Appendix 1, §10).

The President asked the CIPM for comments. Following a discussion it was agreed that any decision should be deferred until the CIPM members have had an opportunity to review the relevant documents. The consensus was that a working group should be set up to review the issue of terminology and report back to the next session in October 2015. The working group will consist of Dr McLaren (Chair), Prof. Ullrich, Dr Louw and Dr Milton. The working group will be able to consult other people as required for advice.

Decision CIPM/104-25 The CIPM decided to defer the discussion on the BIPM terminology agenda item until its next meeting. It established a small working group composed of J. McLaren (Chair), J. Ullrich, W. Louw and M. Milton to review the issue and to report back to its next meeting.

26. DATES FOR CIPM MEETINGS IN 2016 AND 2017

The Director proposed that in 2016 and 2017 the CIPM should meet only once, in the same week as the meeting of NMI Directors and Member State Representatives. Week 43 was proposed for the two meetings in 2016. The CIPM meeting would last for three days, followed by a two-day meeting of NMI Directors and Member State Representatives. The President recalled that the CIPM previously met only once a year around October. This was changed to two-meetings per year to allow the CIPM to approve the financial statements earlier in each year. He suggested that it may be more efficient to return to one meeting per year, with a duration of three days. This would also allow the CIPM to spend more time during the extra day to discuss issues such as strategy and to take more time to discuss scientific issues. It would also allow improvements in efficiency by not having two Secretary's Reports and Director's Reports each year. In years following a General Conference, the meeting would be divided into two sessions as per the current practice. The first session would be to elect the new bureau and to follow up actions from the General Conference.

It was queried how there will be more time for strategic discussions if the duration of CIPM meetings is reduced from four-days to three-days during a year. A concern was expressed that the CIPM's direct contact with the BIPM will be diminished if it only meets once a year and more pressure will be placed on the bureau. There will also be more pressure on the CIPM to communicate via email in between meetings. It was also commented that if the CIPM meeting is only held once a year in the same week as the meeting of NMI Directors and Member State Representatives, the agenda for the CIPM meeting may be dictated by the latter. The President noted that contact with the BIPM should not be diminished if there is a return to one meeting per year because of the amount of work that is now carried out in CIPM

Sub-Committees and *ad hoc* Working Groups; governance of the BIPM has actually increased. Much of this work was previously undertaken by the CIPM and the bureau.

It was commented that it would be useful to include a day at CIPM meetings to discuss issues of common interest to CC Presidents.

The President confirmed that the suggestion of returning to one CIPM meeting each year would be revisited in October 2015.

27. ANY OTHER BUSINESS

Dr May referred to Decision CIPM/103-37 *The CIPM asked Dr May to recirculate the request of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) for traceability exception related to isotope ratio delta values to the CIPM members so that a decision can be made.* He presented the amended text for the traceability exception related to delta value isotope ratio measurements and proposed that the CIPM accept it as amended. The CIPM agreed.

Decision CIPM/104-26 The CIPM adopted the traceability exception related to delta value isotope ratio measurements proposed by the CCQM as follows:

“Delta value isotope ratio measurements that cannot presently be made traceable to the SI should be made traceable to materials* recognised as International Standards. Since at present, values assigned to these materials are based on consensus values, these materials are not listed in the Appendix C of the BIPM Database.

* A list of certified reference materials that should be used to identify accepted references for delta value isotope ratio traceability statements is published and maintained by IUPAC:

Willi A. Brand, Tyler B. Coplen, Jochen Vogl, Martin Rosner and Thomas Prohaska, Assessment of international reference materials for isotope-ratio analysis (IUPAC Technical Report). *Pure Appl. Chem.* 2014; 86(3): 425–467

The report is available for free download: <http://www.degruyter.com/doi/10.1515/pac-2013-1023>”

The CIPM notes that assigned values for replacement materials should be done through a formal internationally vetted procedure that assures the continued comparability of delta value measurements.

The CIPM encourages the continuation of programmes within the NMIs to develop absolute isotope ratio measurement values for such Reference Materials and active engagement with the IUPAC community.”

Dr Usuda commented that the latest draft of the GUM is being circulated for comments from the stakeholders. He asked about its current status. The Director commented that the closing date for comments is 3 April. The JCGM Working Group on the Expression of Uncertainty in Measurement (GUM) (WG1) has been made aware that they will receive a significant amount of feedback and they will need to make preparations to deal with it.

The President thanked the BIPM staff for their work during the meeting and wished the members of the CIPM safe travel and closed the meeting.

Appendix 1

REPORT OF THE SECRETARY AND ACTIVITIES OF THE BUREAU OF THE CIPM

(November 2014 - March 2015)

Note: this report is the first part of the Secretary's report to the CIPM, presented at its Session I of the 104th meeting of the CIPM in March 2015

1. Meetings of the bureau of the CIPM (the "bureau")

Since the last meeting of the CIPM on 13-14 November 2014, the bureau has met once on 6-8 March 2015 at the Pavillon de Breteuil. During the period November 2014 to March 2015, the Secretary paid two additional visits to the BIPM: the meeting of the JCTLM Executive on 4-5 December 2014, and the 7th meeting of the CIPM Sub-Committee on the Pension Fund and Health Insurance on 20 January 2015.

On both occasions the Secretary met with the Director of the BIPM and other staff members to discuss, among other things, the Notification 2015, the upcoming review of ISO/IEC 17025 and a number of staff issues.

Over the period November 2014 to March 2015, the President and the Secretary have participated in a few teleconferences with the Director of the BIPM, in particular addressing preparations for the election process for CIPM officers, the election process for the Chairperson of the Committee for CIPM Election (CEC) and a number of BIPM staff issues.

2. CIPM Renewal Process and CIPM Membership

In conformity with the document "Criteria and Process for Election of CIPM Members" and Resolution 2 adopted by the 25th CGPM (2014), all current and outgoing CIPM Members have resigned with effect from the beginning of the first meeting of the newly elected CIPM in March 2015, except for the President, the Secretary and the Vice-Presidents who will remain in office until the election of the new bureau.

To prepare for the election of the CIPM President, Secretary and Vice-Presidents, the CIPM bureau has prepared and sent out an overview of the tasks and time involved for the roles of CIPM President, Secretary and Vice-Presidents. A list of CIPM members that have expressed their interest in performing one of the duties mentioned above has been prepared.

3. Member States of the BIPM (Member States) and Associates of the CGPM (Associates)

Unfortunately, by 31 December 2014 the Dominican Republic had failed to comply for more than twelve months with the Rescheduling Agreement, which they had signed on 30 July 2012, by having not paid the agreed amounts due for 2013 and 2014. Therefore, pursuant to Article 4 of the Agreement, and

in agreement with the Resolution 7 adopted by the 24th CGPM (2011), the Dominican Republic has been excluded on 1 January 2015.

This will bring the number of Member States back to 55.

As of 31 December 2014, Sri Lanka, being an Associate of the CGPM, had not settled its subscriptions for 2012, 2013 and 2014, and as a result had built up arrears for a period of more than three years. As a consequence Sri Lanka has been excluded as an Associate of the CGPM on 1 January 2015.

On 1 January 2015, the Republic of Azerbaijan became an Associate of the CGPM. The number of Associates therefore stays at 41.

As reported in November 2014, in conformity with the Resolution 4 “On the status of Associate State of the General Conference”, adopted by the 24th meeting of the CGPM (2011), a group of 19 Associates has been formally encouraged to become Member States. So far, none of these have decided to become a Member State, although a small number have made enquiries in this direction.

4. Member States and Associates in financial arrears for more than three years

Since 1 January 2015 none of the current Member States and Associates have arrears for more than three years. However, the BIPM will continue to monitor the timely payment of dotation contributions by all Member States and subscriptions by the Associates, and will signal Member States and Associates in a timely manner when the non-payment of their contributions or subscriptions constitutes a risk for their status within the BIPM.

Following the discussions with the Islamic Republic of Iran, and taking into account the payments received in compliance with the Rescheduling Agreement signed in 2012, an Amendment to the Rescheduling Agreement has been signed on 14 November 2014, that *inter alia* provisionally freezes the effects of the 2012 Rescheduling Agreement in its part related to the sums due for the payment of the arrears. The amended Agreement requires continuity in payment of the Member State contribution in the year it is due, but suspends further debt repayment. This new, amended agreement will allow the CGPM to duly address the position of the Islamic Republic of Iran at its 26th meeting in 2018.

5. CIPM Sub-Committees and CIPM *ad hoc* Working Groups

The CIPM Sub-Committee on the Pension Fund and Health Insurance held its 7th meeting on 20 January 2015 at the BIPM. A proposal for the establishment of a CIPM Advisory Board for the BIPM Pension and Provident Fund has been discussed and will be presented to the CIPM later in the agenda. The Mercer Company has been asked to advise again on the further details of the best scenario for a sustainable Pension and Provident Fund. The outcome of this additional study will be presented and discussed in the next meeting of the Sub-Committee on 16 April 2015.

Gathering information to compare the BIPM's health insurance with the French Social Security system is continuing. The CIPM Sub-Committee on Finance has continued to work together with the BIPM staff.

The CIPM *ad hoc* Working Groups on CIPM Membership, and Conditions of Employment, have also continued their activities and will report on their activities later in the agenda of this meeting.

6. Presidency of Consultative Committees (CCs) and membership of CIPM Sub-Committees and *ad hoc* Working Groups

After the appointment in November 2014 of the Presidents of the CCRI and CCAUV, two new vacancies exist for presidency of the CCL and the CCPR. As CIPM members are expected to actively participate in the different CIPM Sub-Committees, *ad hoc* Working Groups and other BIPM/CIPM committees, the bureau has started to consider the needs for participation by CIPM members in the different activities and the available expertise and capabilities.

7. The CIPM MRA

On 17 November 2014 the Yemen Standardization, Metrology and Quality Control Organization (YSMO) signed the CIPM MRA.

On 20 November 2014 the Directorate General for Standards and Metrology - DGSM of Oman signed the CIPM MRA.

On 28 January 2015 the State Committee for Standardization, Metrology and Patent - AZSTAND of the Republic of Azerbaijan signed the CIPM MRA, bringing the number of signatories to 98 institutes from 53 Member States, 41 Associates and 4 international organizations, and covering a further 152 institutes designated by the signatory bodies.

Due to internal changes in the administration of the Republic of Lithuania, the responsibilities of the NMI have been transferred from the Ministry to the Center for Physical Sciences and Technology (FTMC), who re-signed the CIPM MRA on 17 November 2014.

Continued discussions are taking place with a number of new potential Associates and Member States, so it is expected that the number of signatories of the CIPM MRA will further increase in the future.

The next meeting of the JCRB will be held at the BIPM on 18-19 March 2015.

8. Relations with other bodies

8.1 On 4 March 2015 the CIPM and BIPM met with the ILAC, to discuss issues of common interest, such as the review of the CIPM MRA and the input of the laboratory accreditation community to this review, issues concerning the tuning between the ILAC Arrangement and the CIPM MRA and the review of ISO/IEC 17025, ISO Guide 34 and other ISO standards addressing traceability.

8.2 On 5 March 2015 the annual Quadripartite meeting of the BIPM, ILAC, ISO and OIML was held at the BIPM. This meeting is an excellent opportunity to discuss all issues of common interest, including ISO CASCO, ISO REMCO, JCTLM (ISO 15195) and other ISO Technical Committee activities and work programmes.

8.3 As a follow-up of the meeting of the CIPM bureau with the VAMAS leadership on 10 March 2014, and the agreed proposal for a BIPM - VAMAS Workshop to be held in 2016, the CIPM bureau met again with a VAMAS delegation on 6 March 2015. The mutual cooperation, also through VAMAS experts participating in relevant CIPM Consultative Committees, as well as a draft programme for the planned

BIPM/VAMAS Workshop on Challenges in Materials Metrology, to be held at the BIPM in 2016, was discussed.

- 8.4 The annual meeting of the JCTLM Executive was held at the BIPM on 4-5 December 2014. Apart from the usual reports of the two working groups and the review of the proposed reference materials, reference measurement methods and reference measurement services to be published in the JCTLM database, a major discussion was devoted to the future organization of the JCTLM. The JCTLM Executive has decided to become more inclusive by opening the Executive to more international organizations and bodies with a clear interest in promoting reliable, comparable and traceable measurements in clinical chemistry and laboratory medicine, such as the World Health Organization (WHO), the International Society on Thrombosis and Haemostasis (ISTH), the International Union on Biochemistry and Molecular Biology (IUBMB), etc.

The Executive is also of the opinion that more awareness by and active participation of the clinical chemistry and laboratory medicine community should be promoted, as nowhere near all the measurands used in the field are covered by the activities of the JCTLM. Therefore, more involvement of all members and stakeholders in the activities of the JCTLM is needed.

The concerns expressed by the CIPM in November 2014 concerning “ordinary membership” of the JCTLM, including commercial stakeholders, have been discussed and a new proposal has been developed by the *ad hoc* JCTLM Working Group charged with the reorganization. BIPM and CIPM are represented in this working group by Dr Wielgosz, Executive Secretary of the JCTLM and Dr Kaarls. The amended version will be presented to the CIPM for discussion and approval. A more frequent and regular communication with and education of the wider clinical chemistry and laboratory medicine community will be realized by a new third JCTLM Working Group on Education and promotion, which will, among other things be charged with the communication and organization of the biennial members and stakeholders meetings.

Concerning the costs of the JCTLM Secretariat, which is kept by the BIPM, the IFCC will continue to share these costs with the BIPM on a 50:50 basis. However, it is the intention that the costs of the biennial members and stakeholders meetings and other educational and communications costs are covered by contributions of the wider members and stakeholders communities.

- 8.5 The first meeting of the ISO CASCO WG 44 charged with a full review of the ISO/IEC 17025 took place at the ISO headquarters in Geneva, Switzerland, on 10-12 February 2015. Mr Henson and Dr Kaarls have been charged by the CIPM to liaise on behalf of the BIPM and CIPM with the ISO CASCO WG 44. A number of principal viewpoints have been formulated, which were and will continue to be brought in during the discussions of the WG 44. A report on the outcome of the first meeting of the ISO CASCO WG 44 will be presented later in the agenda, as well as the proposed principles formulated by the BIPM/CIPM team together with some proposed actions.

ISO Guide 34 is to become a standard under the joint direction of ISO REMCO and ISO CASCO and again guidance to the BIPM on its liaison role will need to be discussed.

In addition to the ISO standards and Guides mentioned before, attention also has to be paid to the review of ISO 17011, as this standard also defines the scope of the activities of the accreditation bodies and thus influences the accreditation of calibration bodies in general and of the NMIs/DIs in particular with respect to the CIPM MRA.

9. BIPM administrative and staff matters

9.1 The *Notification Des Parts Contributives et des Souscriptions* for the year 2015 has been prepared and sent out in December 2014. The consequences of the rescheduling agreements signed with some States, as well as the accession of new Member States to the Metre Convention and the changing status of a number of Associates have been carefully taken into account.

9.2 An additional report has been commissioned to Mercer detailing the best and optimum scenario leading to a sustainable BIPM Pension and Provident Fund. In the meantime the BIPM has prepared a number of amendments to the Regulations and Rules of the BIPM Pension and Provident Fund, the Financial Regulations of the Pension and Provident Fund, the BIPM Financial Regulations and the Regulations, Rules and Instructions applicable to the staff members of the BIPM, all needed as a consequence of the establishment of the Pension Fund Advisory Board. These changes were discussed and approved by the CIPM Sub-Committee on the Pension Fund and Health Insurance and will be presented to the CIPM for their approval later in the agenda.

Studies concerning the BIPM Health Insurance have been initiated and will be further discussed later in 2015.

10. Terminology

In accordance with Decisions CIPM/103-22 and CIPM/103-25, the bureau reviewed all material submitted by Dr Quinn and Ms Arlen (head of the BIPM Legal, Administration and Human Resources Office) and, at its meeting on 7 March 2015, again discussed the issue of terminology. The bureau unanimously agreed that the recommendation of the bureau to the CIPM is that the CIPM decision taken in 2007 on the use of the term “BIPM” should stand and that the policy regarding its use, articulated in a joint statement by Dr Quinn and Ms Arlen to the CIPM at its 102nd Meeting, Session II and welcomed by the CIPM at that time, should be reconfirmed. The statement is as follows:

Name of Organization: The Metre Convention and its Annexed Regulations created an intergovernmental organization named the BIPM, with its seat at the Pavillon de Breteuil. The organs of the BIPM are; the CGPM, the CIPM and the scientific and administrative organ, referred to in practice as the BIPM. This practice is valid when no legal or institutional issue is at stake.

In regard to reference to the CGPM and its meetings, the bureau recommends that the CIPM support the traditional use of referring to the CGPM as the “Nth Conference or Nth CGPM” in preference to the “Nth Meeting of the Conference or the Nth meeting of CGPM”.

11. Committee for Election of CIPM members (CEC)

In consultation with the members of the Committee for CIPM Election (CEC), elected at the 25th CGPM meeting in November 2014 a process of electing the Chairperson of the CEC through a secret ballot by correspondence has been agreed and executed. As a result Dr Friederike Weritz (Ministry of Economic Affairs and Energy, Germany) has been elected as the Chair of the CEC for the period 2015-2018.

Appendix 2

RECOMMENDATIONS ADOPTED BY THE CIPM

RECOMMENDATION 1 (CI-2015)

CIPM Recommendation to NMIs on managing the consequences of the corrections to the BIPM as-maintained mass unit

The International Committee for Weights and Measures (CIPM),

considering

- the good uniformity of world-wide mass measurements of NMIs in CCM.M-K4 (key comparison of 1 kg stainless steel standards),
- that CMCs for mass calibrations at the level of 1 kg range from 28 μg to 1850 μg ,
- that determinations of the Planck constant will provide the basis for the future definition of the kilogram after the introduction of the “new SI”,
- that an extraordinary calibration using the International Prototype of the Kilogram (IPK) took place at BIPM from January 2014 to January 2015,
- that the as-maintained BIPM mass unit (traceable to the IPK at the 3rd Periodic Verification (3rd PV) 1988-1992) had changed over 22 years by 35 μg ,
- that a mathematical model established by BIPM was able to explain this change between the 3rd PV and 2014,
- that the BIPM will update calibration certificates issued between 1.1.2003 and 31.12.2013 for calibrations of 1 kg mass standards,

decides

- that the published results of key comparisons carried out by the CCM will not be corrected, and that the WGD-kg will advise the RMOs about how degrees of equivalence may be linked in a way that maintains consistency,

recommends

- that determinations of the Planck constant shall be updated based on the corrections provided by the BIPM to the NMIs concerned,
- that NMIs receiving updated calibration certificates from the BIPM should take appropriate action as regards the need to inform their customers and the correction of calibration certificates affected, and should take the updated mass values as the basis for their future calibrations.