

**Bureau international des poids et mesures**

# **Comité international des poids et mesures**

97th meeting (October 2008)

#### Note on the use of the English text

To make its work more widely accessible the International Committee for Weights and Measures publishes an English version of its reports.

Readers should note that the official record is always that of the French text. This must be used when an authoritative reference is required or when there is doubt about the interpretation of the text.

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## MEMBER STATES AND ASSOCIATES OF THE GENERAL CONFERENCE

as of 14 October 2008

### Member States

Argentina	Korea (Dem. People's Rep. of)
Australia	Korea (Rep. of)
Austria	Malaysia
Belgium	Mexico
Brazil	Netherlands
Bulgaria	New Zealand
Cameroon	Norway
Canada	Pakistan
Chile	Poland
China	Portugal
Czech Republic	Romania
Denmark	Russian Federation
Dominican Republic	Serbia
Egypt	Singapore
Finland	Slovakia
France	South Africa
Germany	Spain
Greece	Sweden
Hungary	Switzerland
India	Thailand
Indonesia	Turkey
Iran (Islamic Rep. of)	United Kingdom of Great Britain and Northern Ireland
Ireland	United States of America
Israel	Uruguay
Italy	Venezuela (Bolivarian Rep. of)
Japan	

### Associates of the General Conference

Albania	Cuba
Belarus	Ecuador
Bolivia	Estonia
CARICOM	Georgia
Chinese Taipei	Hong Kong, China
Costa Rica	Jamaica
Croatia	Kazakhstan

.../...

**Associates of the General Conference (cont.)**

Kenya	Philippines
Latvia	Slovenia
Lithuania	Sri Lanka
Macedonia (the FYR of)	Tunisia
Malta	Ukraine
Moldova (Rep. of)	Viet Nam
Panama	

## THE BIPM

The International Bureau of Weights and Measures (BIPM) was set up by the Metre Convention signed in Paris on 20 May 1875 by seventeen States during the final session of the diplomatic Conference of the Metre. This Convention was amended in 1921.

The BIPM has its headquarters near Paris, in the grounds (43 520 m<sup>2</sup>) of the Pavillon de Breteuil (Parc de Saint-Cloud) placed at its disposal by the French Government; its upkeep is financed jointly by the Member States.

The task of the BIPM is to ensure worldwide unification of measurements; its function is thus to:

- establish fundamental standards and scales for the measurement of the principal physical quantities and maintain the international prototypes;
- carry out comparisons of national and international standards;
- ensure the coordination of corresponding measurement techniques;
- carry out and coordinate measurements of the fundamental physical constants relevant to these activities.

The BIPM operates under the exclusive direction and supervision of the International Committee for Weights and Measures (CIPM) which itself comes under the authority of the General Conference on Weights and Measures (CGPM) and reports to it on the work accomplished by the BIPM.

Delegates from all Member States attend the General Conference which, at present, meets every four years. The function of these meetings is to:

- discuss and initiate the arrangements required to ensure the propagation and improvement of the International System of Units (SI), which is the modern form of the metric system;
- confirm the results of new fundamental metrological determinations and various scientific resolutions of international scope;
- take all major decisions concerning the finance, organization and development of the BIPM.

The CIPM has eighteen members each of a different nationality: at present, it meets every year. The officers of this committee present an annual report on the administrative and financial position of the BIPM to the Governments of the Member States. The principal task of the CIPM is to ensure worldwide uniformity in units of measurement. It does this by direct action or by submitting proposals to the CGPM.

The activities of the BIPM, which in the beginning were limited to measurements of length and mass, and to metrological studies in relation to these quantities, have been extended to standards of measurement of electricity (1927), photometry and radiometry (1937), ionizing radiation (1960), time scales (1988) and to chemistry (2000). To this end the original laboratories, built in 1876-1878, were enlarged in 1929; new buildings were constructed in 1963-1964 for the ionizing radiation laboratories, in 1984 for the laser work and in 1988 for a library and offices. In 2001 a new building for the workshop, offices and meeting rooms was opened.

Some forty-five physicists and technicians work in the BIPM laboratories. They mainly conduct international comparisons of realizations of units, calibrations of standards and metrological research,. An annual report, the *Director's Report on the Activity and Management of the International Bureau of Weights and Measures*, gives details of the work in progress.

Following the extension of the work entrusted to the BIPM in 1927, the CIPM has set up bodies, known as Consultative Committees, whose function is to provide it with information on matters that it refers to them for study and advice. These Consultative Committees, which may form temporary or permanent working groups to study special topics, are responsible for coordinating the international work carried out in their respective fields and for proposing recommendations to the CIPM concerning units.

The Consultative Committees have common regulations (*BIPM Proc.-Verb. Com. Int. Poids et Mesures*, 1963, **31**, 97). They meet at irregular intervals. The president of each Consultative Committee is designated by the CIPM and is normally a member of the CIPM. The members of the Consultative Committees are metrology laboratories and specialized institutes, agreed by the CIPM, which send delegates of their choice. In addition, there are individual members appointed by the CIPM, and a representative of the BIPM (Criteria for membership of Consultative Committees, *BIPM Proc.-Verb. Com. Int. Poids et Mesures*, 1996, **64**, 124). At present, there are ten such committees:

1. The Consultative Committee for Electricity and Magnetism (CCEM), new name given in 1997 to the Consultative Committee for Electricity (CCE) set up in 1927.
2. The Consultative Committee for Photometry and Radiometry (CCPR), new name given in 1971 to the Consultative Committee for

Photometry (CCP) set up in 1933 (between 1930 and 1933 the CCE dealt with matters concerning photometry).

3. The Consultative Committee for Thermometry (CCT), set up in 1937.
4. The Consultative Committee for Length (CCL), new name given in 1997 to the Consultative Committee for the Definition of the Metre (CCDM), set up in 1952.
5. The Consultative Committee for Time and Frequency (CCTF), new name given in 1997 to the Consultative Committee for the Definition of the Second (CCDS) set up in 1956.
6. The Consultative Committee for Ionizing Radiation (CCRI), new name given in 1997 to the Consultative Committee for Standards of Ionizing Radiation (CCEMRI) set up in 1958 (in 1969 this committee established four sections: Section I (X- and  $\gamma$ -rays, charged particles), Section II (Measurement of radionuclides), Section III (Neutron measurements), Section IV ( $\alpha$ -energy standards); in 1975 this last section was dissolved and Section II was made responsible for its field of activity).
7. The Consultative Committee for Units (CCU), set up in 1964 (this committee replaced the “Commission for the System of Units” set up by the CIPM in 1954).
8. The Consultative Committee for Mass and Related Quantities (CCM), set up in 1980.
9. The Consultative Committee for Amount of Substance: Metrology in chemistry (CCQM), set up in 1993.
10. The Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV), set up in 1999.

The proceedings of the General Conference and the CIPM are published in the following series:

- *Report of the meeting of the General Conference on Weights and Measures;*
- *Report of the meeting of the International Committee for Weights and Measures.*

The CIPM decided in 2003 that the reports of meetings of the Consultative Committees should no longer be printed, but would be placed on the BIPM website, in their original language.

The BIPM also publishes monographs on special metrological subjects and, under the title *The International System of Units (SI)*, a brochure,

periodically updated, in which are collected all the decisions and recommendations concerning units.

The collection of the *Travaux et Mémoires du Bureau International des Poids et Mesures* (22 volumes published between 1881 and 1966) and the *Recueil de Travaux du Bureau International des Poids et Mesures* (11 volumes published between 1966 and 1988) ceased by a decision of the CIPM.

The scientific work of the BIPM is published in the open scientific literature and an annual list of publications appears in the *Director's Report on the Activity and Management of the International Bureau of Weights and Measures*.

Since 1965 *Metrologia*, an international journal published under the auspices of the CIPM, has printed articles dealing with scientific metrology, improvements in methods of measurement, work on standards and units, as well as reports concerning the activities, decisions and recommendations of the BIPM.

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

as of 14 October 2008

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on 1 January 2009

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**Emeritus Directors:** Prof. P. Giacomo, Dr T.J. Quinn

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1 Also Publications.

2 Also Site Maintenance.

**International Committee  
for Weights and Measures**

**Proceedings of the sessions  
of the 97th meeting**

(14 – 17 October 2008)

## Agenda

1. Opening of the meeting; quorum; agenda
2. Report of the Secretary and activities of the bureau of the CIPM (November 2007 – October 2008)
3. Membership of the CIPM
4. Report on the present status of the CIPM MRA
5. BIPM/ILAC Joint Working Group
6. Report on steps taken to implement the report from Dr Bennett on materials metrology and the MoU with VAMAS
7. Presentation of the BIPM science programme and laboratory visits
8. International System of Units (SI)
9. Report from Consultative Committees
10. Joint Committee for Traceability in Laboratory Medicine (JCTLM)
11. Contacts with other intergovernmental organizations and international bodies
12. Joint Committee for Guides in Metrology (JCGM)
13. *Metrologia*
14. Follow-up from the 23rd meeting of the CGPM
15. Preparation for the 24th meeting of the CGPM
16. Work of the BIPM
17. Administrative and financial affairs
18. Other business
19. Date of next meeting

**1 OPENING OF THE MEETING;  
QUORUM;  
AGENDA**

The International Committee for Weights and Measures (CIPM) held its 97th meeting from Tuesday 14 October to Friday 17 October 2008 at the Pavillon de Breteuil, Sèvres.

Present: S. Bennett, Kwang Hwa Chung (present from Wednesday 15 October 2008), L. Énard, Gao Jie, E.O. Göbel, F. Hengstberger, B. Inglis, L.K. Issaev, R. Kaarls, J.W. McLaren, W. May (present until Thursday morning, 16 October), H. Nava-Jaimes (present on Tuesday and Wednesday, 14 and 15 October), A. Sacconi, W. Schwitz, M. Tanaka, H. Ugur, J. Valdés, A.J. Wallard (Director of the BIPM).

Also attending: P. Giacomo and T.J. Quinn (Emeritus Directors of the BIPM), I.M. Mills (President of the CCU, present for part of the meeting); F. Joly (Secretariat); J.R. Miles (Publications). Also in attendance for parts of the meeting: B. Perent (Head of Finance and Administration of the BIPM, Administrator), R. Cèbe (Legal Adviser), J.H. Williams (Head of Publications), and the following Executive Secretaries of Consultative Committees and other contact persons: P.J. Allisy-Roberts, E.F. Arias, R.S. Davis, P.I. Espina, R. Felder, L. Mussio, M. Stock, M. Streak, C. Thomas, R.I. Wielgosz.

Prof. Göbel, President of the CIPM, opened the 97th meeting of the CIPM by welcoming all present. He reported that two members had sent apologies: Dr Carneiro was unwell, and Dr Kwang Hwa Chung would arrive on Wednesday 15 October. Prof. Göbel noted that there had been three resignations since the 96th meeting, and welcomed the three new members who had been elected in their place: Dr Willie May, Dr Hector Nava-Jaimes and Dr Kwang Hwa Chung (absent at that time). With nearly all members present (16 out of 18 on Tuesday 14 October), the quorum was satisfied according to Article 12 of the Rules annexed to the Metre Convention.

The draft agenda was accepted without change, and the minutes of the 2007 meeting were accepted without comment. The President then invited Dr Kaarls, Secretary of the CIPM, to present his report.

## **2 REPORT OF THE SECRETARY AND ACTIVITIES OF THE BUREAU OF THE CIPM (NOVEMBER 2007 – OCTOBER 2008)**

Dr Kaarls read the report of the Secretary, saying that changes to the report were made up until the last minute and for that reason the report had not been distributed in advance of the meeting.

All the important matters arising in the report of the Secretary are taken up later in the meeting, and references are given to the relevant sections of the report.

### **2.1 Meetings of the bureau of the CIPM**

The bureau of the CIPM (“the bureau”) has met on three occasions since the last meeting of the CIPM: in March and October 2008 at the BIPM Headquarters in Sèvres and in June 2008 during the CPEM meeting in Boulder, United States of America<sup>1</sup>. In addition, the Secretary of the CIPM has made several visits to the BIPM and has held a number of discussions with the Director of the BIPM.

The bureau also held its regular liaison meeting with the International Organization of Legal Metrology (OIML) and the International Laboratory Accreditation Cooperation (ILAC) in March 2008.

### **2.2 CIPM Membership**

Since the last meeting of the CIPM, three Members announced their resignations, effective from 1 January 2008: Dr Myung-Sai Chung, Republic of Korea, who also served as President of the CCL; Prof. Giorgio Moscati from INMETRO, Brazil, who was Vice President of the CIPM and President of the CCRI; and Dr Hratch Semerjian of the NIST, USA. These vacancies have been filled by the elections of Dr Kwang Hwa Chung of KRISS, Republic of Korea, Dr Willie E. May of NIST, USA, and Dr Hector Nava-Jaimes of CENAM, Mexico.

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<sup>1</sup> Henceforth USA.

The bureau of the CIPM continues to consider carefully the composition of the CIPM, in particular as regards the need to maintain long-term membership. It continues to seek suitable candidates by considering the need for a balance between younger members, who would offer greater continuity, and more experienced members, the geographical distribution and by ensuring an appropriate spread of scientific disciplines. See also §3.

### **2.3 The next Director of the BIPM**

Following the nomination by the CIPM in November 2007 of Prof. Michael Kühne as Director Designate, the bureau has arranged his employment conditions. Prof. Kühne will take up his duties as Deputy Director on 1 April 2009.

### **2.4 Member States of the BIPM (Member States) and Associates of the CGPM (Associates)**

The number of Member States remains at 51. A number of other States have declared their intention to become Member States of the BIPM and are in discussion with the BIPM. This is a very encouraging development.

There has also been a rise in the number of Associate States and Economies of the CGPM to 27, with the accession since last year of Bolivia and Georgia. The BIPM is in touch with a number of other States which have declared their intention to become Associates as well as with some current Associates which are considering becoming Member States.

See also §§11.6, 14.2 and 14.3.

### **2.5 Situation in relation to payments of the contributions by Member States and Associates for 2008**

A number of Member States and Associates have yet to pay their contributions and subscriptions for 2008, and the BIPM has sent reminders to the relevant Member States and Associates. The total outstanding arrears amount to about 1.9 million euros at the end of September 2008, representing 16.7 % of the 2008 budget. One specific case of concern is that only some 22 % of the contribution of the USA has been received so far this year, leading to a shortfall of nearly 8 % of the dotation for 2008.

## **2.6 Member States in financial arrears for more than 3 years**

There continue to be four States in arrears for more than three years: Cameroon, the Dominican Republic, the Islamic Republic of Iran and the Democratic People's Republic of Korea. Actions undertaken since last year will be reported later in the meeting (see §17.2). Despite the renewed and greatly intensified contacts with the Government of the Islamic Republic of Iran, no final settlement has yet been reached.

Recently during the meeting of the SIM General Assembly the Director and the Secretary met with the Director of the national metrology institute of the Dominican Republic. Appointments have been made to initiate discussions, involving also the embassy of the Dominican Republic in Paris to find a solution for the payment of the arrears and the participation of the Dominican Republic in the activities of the BIPM.

## **2.7 Issues for the CIPM to consider in relation to accession of Member States**

During the last year, a number of issues have arisen in relation to accession of Member States.

The bureau has paid specific attention to the case of Peru, which was a Member State from 1875 up to 1956, and which has recently made a request to become an Associate.

As Resolution 5, adopted by the CGPM at its last meeting, states that “an application to become an Associate of the CGPM will not be considered from States which were previously a State party to the Metre Convention”, the accession of Peru as an Associate could be questionable. The bureau of the CIPM was of the opinion that Resolution 5 ruled for the future, as it did not state that it had a retroactive effect, and that it could only apply to States which were Member States of the BIPM at the time of the adoption by the CGPM of Resolution 5 or which would become Member States after its adoption. The legal adviser of the BIPM confirms this view. The case is discussed in §17.3 of this report.

A second issue relates to the accession process of States which were part of a Member State before its secession and, in particular, whether an entry contribution is requested from this newly independent State at the time of accession to the BIPM.



According to Article 11 of the Metre Convention, an acceding State should pay an entry contribution equal to the amount of an annual contribution. At its 49th meeting in October 1960, the CIPM took the decision to set the entry contribution at the same level as that of an annual contribution.

In 1994, the CIPM decided that any newly independent State, previously part of a Member State, should pay an entry contribution if it is not the sole successor State of this Member State. Consequently some States were not required to pay an entry contribution to the BIPM when they were the sole successor State of a Member State. This was the case, for example, of the Russian Federation, which was the sole successor State to the USSR.

This issue has now arisen in relation to Montenegro and the former Serbia and Montenegro. Montenegro declared itself independent from Serbia and the membership of Serbia and Montenegro at the BIPM was continued by the Republic of Serbia, which did not need to accede and did not pay an entry contribution. As a result, Montenegro is an independent State which is not the successor of a previous Member State and will have to pay an entry contribution.

In the case of Kazakhstan – which is in the same legal situation with regard to the former USSR as is Montenegro with regard to Serbia and Montenegro – an entry fee has also been requested for its accession.

## **2.8 Assistance to developing countries and potential new Associates or Member States**

The bureau is convinced that it is important to attract more Member States and Associates so as to increase the influence and impact of the BIPM and the SI world-wide.

The bureau is pleased to see the efforts of the BIPM staff which have led to an increase in the number of Associates and should also lead to an increase, in the near future, in the number of Member States. It urges the BIPM to continue its work, within the limits set by the CGPM, and to seek opportunities to convince States of the value and importance of becoming Member States or Associates.

During the last year, the BIPM has taken on the secretariat of the Joint Committee for the Coordination of Technical Assistance to Developing Countries in Metrology, Accreditation and Standardization (JCDCMAS). This group provides a unique opportunity to harmonize the work of most of

the intergovernmental organizations and international bodies with responsibility for “Metrology, Accreditation and Standardization” (MAS). The BIPM’s own scope for initiatives is limited as the CGPM endorsed only a “limited programme of outreach”. However other members of the JCDCMAS, such as the United Nations Industrial Developments Organization (UNIDO), do have the financial and other resources to organize workshops and national “MAS” events. The BIPM will take advantage of these opportunities to highlight the benefits of membership of the BIPM.

The bureau has also noted, with approval, the initiatives of the Regional Metrology Organizations (RMOs) to act as advocates for the work of the BIPM and to encourage their Members to become Member States of the BIPM or Associates of the CGPM. The bureau appreciates these initiatives and compliments RMOs on their activities.

The bureau is aware that a number of NMIs of Member States have outreach programmes and noted that the BIPM was ready to host a meeting at which the various “international offices” could meet in a forum for discussion and to discuss possible coordination of their work. This idea was reported to the CIPM last year and the proposal was endorsed by the meeting of Directors in November 2007. A detailed description of a seminar for invited participants is presented in §18.

## **2.9 BIPM matters**

### **2.9.1 Staff Regulations and Rules**

On 12 February 2008, Members of the CIPM approved unanimously, by correspondence, the Staff Regulations, Rules and Instructions (RRI) applicable to staff members of the BIPM.

On 20 March 2008, the Governing Body of the International Labour Office approved the BIPM’s recognition of the jurisdiction of the ILO Administrative Tribunal and the RRI came into force on 2 May 2008.

In April 2008, the Director, the Head of the Finance and Administration Section, and the Legal Adviser held three staff meetings conducted in French and then in English, during which the new RRI were presented. Detailed explanations were given at the first two meetings, and at the third meeting they responded to questions raised by the staff. As the time allocated to this meeting was not sufficient to tackle all questions, the Director agreed to

answer the remainder in writing. Some 110 questions were put to the Director and the answers were submitted to the Commission for Conditions of Employment in July 2008.

As already indicated during the meeting of the CIPM in 2007, a salary survey was conducted for the BIPM with the aim of comparing the BIPM remuneration packages with those paid in various employment markets. The conclusion of this study, recently updated with data from the NIST (USA) will be reviewed and it is expected that recommendations on the BIPM remuneration packages will be presented to the CIPM in 2009 with the actuarial study of the BIPM pension scheme that will include the financial consequences of any recommended modifications to the BIPM pension scheme.

Elections of staff representatives took place in June 2008 and the Director had a first meeting with the Commission for Conditions of Employment in September 2008.

The Appeals Committee, which includes four members and four substitutes, was set up: two members and two substitutes being designated by the staff members and two members and two substitutes being nominated by the Director. The Director appointed Mr L. Picard, former member of the International Labour Office, as Chair of the Appeals Committee. See further details in §17.8.

#### 2.9.2 Headquarters Agreement

On 30 July 2008, the French Republic adopted a law ratifying the amendments to the Headquarters Agreement of the BIPM which was published in the *Journal Officiel de la République française* of 30 July 2008. The four official texts which constitute the Headquarters Agreement of the BIPM, as well as a non-official consolidated French and English version of the four texts, drafted for easy reference, will be circulated to the members of the CIPM.

#### 2.9.3 Financial Regulations

A sound financial management system is essential to the effective operation of the BIPM. The bureau of the CIPM has considered the need to update the Financial Regulations, as the current Financial Regulations, included in the

Metre Convention and in the *Règlement administratif et financier*, are insufficient to fully address future challenges in terms of financing and accountability. It has also considered the need to review the accounting principles, currently a cash-based accounting system, to move to an accruals accounting system. Such an amendment would be aimed at increasing the effectiveness and efficiency of the financial management, reinforcing accountability and transparency and ensuring the most effective use of resources in the achievement of the new work programme. Revised Draft Financial Regulations will be proposed to the CIPM at its 98th meeting (2009) at which its approval will be sought.

#### 2.9.4 Quality System

The Secretary attended the annual management review of the BIPM's Quality System in September 2008.

The BIPM staff member responsible for quality has been on extended sick-leave, but the BIPM was able to take advantage of the expertise of a secondee with experience in quality, who has initiated a programme of internal and external audits.

The management meeting reviewed the external audit of the Quality System, which has shown the current BIPM system to be in conformity with ISO/IEC 17025 but which made several useful suggestions for improving the documentation. This work is in progress. No non-conformities, errors or complaints were recorded.

#### 2.9.5 Potential problems in the depository of the metric prototypes

In February 2008, the air-conditioning system for the upper "caveau", which contains the international mass prototypes, appeared to be malfunctioning and there was a suspicion that there may have been an abnormally high level of humidity, possibly due to water ingress. On 25 February 2008, the Director wrote to the CIPM requesting permission to take possession, for a period of no more than 3 months, of all the three keys to the depository so as to investigate the source of the problem. All CIPM members agreed. The first of the two additional keys was delivered personally by the President of the CIPM during the CIPM bureau meeting of 3–4 March 2008 and the third was

collected from the Archives de France by a BIPM staff member on 3 March 2008.

In the presence of the members of the bureau of the CIPM, the vault was opened on 3 March 2008. There was no evidence of water or dampness and it was concluded that the air-conditioning system itself needed attention. The safe containing the international prototype was not opened. The Director then passed the three keys to the Head of the BIPM Workshop and Site Maintenance Section so that the necessary investigations could be carried out.

The BIPM's air-conditioning contractor carried out repairs and adjustments to the air-conditioning system, and the opportunity was taken to repaint and waterproof the walls of the vault.

The Head of the Workshop and Site Maintenance Section returned the three keys to the BIPM Director on 27 May 2008. The key of the Archives de France was returned on 29 May 2008 and the Director kept the key of the President in his safe.

#### 2.9.6 Ionizing radiation at the BIPM

In the light of the radiation leak at the NIST (Boulder, USA) in July 2008, the Director informed the bureau that he had initiated an immediate review of the BIPM's internal security processes. He reported that these were up to date and that they were fully implemented.

#### 2.9.7 Summer School

Although the bureau was not directly involved in the BIPM 2008 Metrology Summer School, it received regular reports and members of the bureau heard very positive comments from students and NMIs. The School was clearly a great success and the BIPM's reputation amongst NMIs has been enhanced. The bureau extends its congratulations and thanks to the Scientific Secretary and the co-directors of the Summer School and to all the BIPM staff who supported it.

## **2.10 CIPM MRA issues**

### **2.10.1 The JCRB**

The Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB) has met twice in 2008 and there appears to be no reduction in the level of its activity and no need to reduce the number of meetings. The work of the Committee will be reported in detail in §4.1.

The main issues considered by the 20th meeting of the JCRB, held in New Zealand in May 2008, were:

- the criteria for acceptance by the CIPM of a new RMO (see discussion under §4.1); and
- the state of metrology in the Gulf region (as a result of a presentation by representatives of the embryonic “GULFMET”).

The JCRB held its 21st meeting at the BIPM in September 2008, during which it discussed

- traceability policy and the use of NMIs or accredited laboratories;
- issues related to the more efficient use of peer review and other on-site visits by accreditors in those cases where an NMI has chosen third party accreditation; and
- issues related to the approval of new RMOs by the CIPM.

The CIPM MRA logo is now authorized for use by 70 laboratories.

The secondment from NIST, USA, of Dr P. Espina as Executive Secretary of the JCRB came to an end in May 2008, and Prof. L. Mussio assumed the position on secondment from the LATU, Uruguay. This arrangement is made possible with the help of additional voluntary financial support kindly provided by the PTB, Germany. The bureau is grateful for the hard work of the two people concerned as well as for the secondment support offered by NIST and LATU to the BIPM.

### **2.10.2 Signatories of the CIPM MRA**

The CIPM MRA has now been signed by the representatives of 74 institutes from 45 Member States, 27 Associates of the CGPM and 2 international organizations (the IAEA and IRMM), and covers a further 120 institutes designated by the national authorities.

### 2.10.3 Other signatories: the World Meteorological Organization (WMO)

The bureau of the CIPM has kept in touch with the developments in relation to the interest of the WMO in signing the CIPM MRA. As the CIPM will discuss later (see §4.3), the action currently lies with the WMO to respond to a “side letter” drafted by the BIPM, concerning the laboratories the WMO intends to designate to represent it in its activities within the CIPM MRA. The BIPM has informed the NMIs of the host countries of the laboratories which the WMO wishes to designate. The bureau hopes that this long negotiation, which will set a precedent for other intergovernmental organizations which do not own and operate their own laboratories, will be completed within the next few months.

### 2.10.4 Work with the ILAC, and the accreditation community in relation to the CIPM MRA and the Key Comparison Database.

After the acceptance in November 2007, by the CIPM and the ILAC General Assembly of a common definition of the term “CMC”, attention has turned to two matters. The first concerns implementing the term CMC and raising awareness amongst accreditors and assessors. The second is to consider ways of encouraging more effective use of resources for the accreditation of NMIs and the acceptance of changes to CMCs.

The CMC definition has, of course, created rather a large impact in the accreditation world. It will take some time to become commonly used but already the BIPM is receiving feedback that there is much activity. For example, during the NCSLI conference in the USA last August, the BIPM Director took part in two panel sessions related to CMCs and to traceability to the SI rather than to its realization at a particular named NMI. The response was generally very positive. Industrial and other speakers accepted the value of SI traceability as a general concept and of the improvements it could bring in the treatment of uncertainty in CMC claims from accredited laboratories. There was also greater interest from the chemical and related industries to the concept of SI traceability in that sector.

With regard to the use of limited specialist assessor resources by accreditors, and bearing in mind common practice in the NMIs, the BIPM has been concentrating on the following issues:

- the value of an agreement between the RMOs and the Regional Cooperation of Accreditation Bodies (RCABs) to use the results of peer

reviews (either on-site or through the RMO review process) to harmonize the laboratories' accredited scopes and the CMC entries in the KCDB. This would help reduce NMI costs and also avoid confusion by assessors when they check the CMCs or the accredited scopes of an NMI through which the accredited laboratory claims traceability to the SI. There is more work to be done with RMOs on this issue as some RMOs require NMIs to become accredited before the NMI can offer CMCs for the regional reviews;

- greater consistency between service level categories as agreed by the CIPM Consultative Committees (CCs) and the service categories used by accredited laboratories. This would also aid the checking and validation of uncertainty and traceability. Approaches have been made to the CCs to ask them to provide leadership from the BIPM and to liaise with accreditation specialists to address this problem;
- consistent treatment of the uncertainties associated with the “device under test”. There is inconsistency in applying the current JCRB policy by NMIs as well as differing “common practice” between sectors. The CCs will need to take a lead in establishing consistent practice.

The BIPM is also working with the ILAC on a number of policy reviews, notably a guide for the accreditation of NMIs, and increased awareness of the CIPM MRA and the KCDB amongst assessors.

#### 2.10.5 The CIPM MRA database (KCDB)

The bureau had a number of discussions about the name of the KCDB. There are two conflicting issues. The first is that the major use of the KCDB is for CMC data rather than for the results of key comparisons. This would argue for a change of name. On the other hand, the acronym KCDB is well known and has a market presence and it might be confusing to rename the database. Finally the bureau agreed not to propose any change to the name of the KCDB.

The bureau noted that the Director and the KCDB manager had published a joint paper on the use of the KCDB and this was helping raise awareness; its use by assessors is encouraged when they check traceability and CMC claims in accredited laboratories.

As of 25 August 2008, Appendix B of the database covered 621 key comparisons and 190 supplementary comparisons. Among these 621 key comparisons, 303 had their Final Reports approved and posted in the KCDB,



providing a total of about 1050 graphs of equivalence. The results of 84 RMO key comparisons are published in the KCDB. Linkage has also been carried out for 15 bilateral key comparisons subsequent to full-scale CC key comparisons; their results are added on the appropriate graphs of equivalence. As of 25 August 2008, 20 414 CMCs were published in Appendix C of the KCDB.

We believe that the number of users of the KCDB continues to increase. It is hard to gather the data, however, particularly because of the number of robot search engines.

The 9th edition of the *KCDB Newsletter* was issued in June 2008. The Newsletter maintains a high standard of reporting, with contributions from NMIs as well as the BIPM, and includes news about the database itself as well as case studies and feedback from the JCRB and other relevant meetings. The NCSLI has recently taken the initiative to alert its members regularly to new issues, thereby increasing the readership and awareness of the work of the BIPM.

#### 2.10.6 Ten years of the CIPM MRA

As 2009 sees the 10th anniversary of the signing of the CIPM MRA, the bureau of the CIPM considers that the occasion should be celebrated with a conference or symposium. Current planning is that a celebration will be organized alongside the meeting of NMI Directors to be held in early October 2009, with invitations to users and potential users from industry, regulators, and intergovernmental organizations. The bureau is aware of at least one other event which will mark this decade, namely the International Metrology Congress that will take place in Paris from 22–25 June 2009 and which will include a plenary session on the CIPM MRA. The bureau would like to encourage other NMIs and Governments to promote the achievements of the CIPM MRA and its widespread use, in particular in the regulated sector.

### 2.11 Regional Metrology Organizations

The initiative to create AFRIMETS, the Intra-Africa Metrology System with five sub-regions of which SADC MET will be one, is progressing well. The BIPM has assisted in several preparatory actions and a request from

AFRIMETS to participate in the JCRB as the RMO representing the African continent will be discussed later (see §4.1).

The bureau also heard reports from the Director on the emergence of “GULFMET”, led by the Gulf Standards Organization. The current members are: the United Arab Emirates, the Kingdom of Bahrain, the Kingdom of Saudi Arabia, the Sultanate of Oman, the State of Qatar, and the State of Kuwait. Their aim is to become a recognized RMO and to ensure the equivalence of their members’ national standards and their international recognition. There is a high degree of enthusiasm amongst these States and the bureau welcomes this regional initiative.

## **2.12 Actions as a result of the 23rd meeting of the General Conference on Weights and Measures (CGPM)**

The financial outcome in relation to the BIPM dotation was disappointing in the light of the careful preparation for the meeting of the CGPM and the high degree of support expressed by a number of Member States. The bureau has reflected on the process used to agree the dotation.

However it is clear that between meetings of the CGPM it is important to maintain contact between the BIPM and Member State Governments, so as to complement the regular relations and interactions the BIPM has with NMIs. A number of potential initiatives have been considered, including producing a short “highlights” report to draw attention to political and financial issues, particularly those of relevance to international trade, etc.; this shorter report would supplement, not replace, the comprehensive report issued each year by the Director.

In a second initiative, the United Kingdom of Great Britain and Northern Ireland<sup>2</sup> Government has suggested that there should be regular meetings of the Government representatives concerned with the implementation of the new European Metrology Research Programme. If these meetings are successful, then government representatives from outside Europe could be invited and this could provide an opportunity for the BIPM to maintain contacts at that level.

The main action resulting from the decisions of the CGPM is, however, the need to prioritize and reduce the programme of work of the BIPM to meet the

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<sup>2</sup> Henceforth UK.

dotation voted by the CGPM. The bureau has followed the work of the Director and during its June meeting considered a report in which the Director outlined his approach to the situation and gained the bureau's general endorsement of a recommendation to the CIPM which involved a combination of a reduced programme of work, overhead savings and a limited use of reserves. The Director's final report and recommendations to the CIPM are discussed in §14.1.

Criteria for reviewing the status of Associates with a view to encouraging them to accede to the Metre Convention are in preparation. Draft criteria will be presented for discussion during this meeting (see §14.3) with the intention of proposing a final set of criteria to the CIPM in 2009.

Rules for the acceptance of Economies as Associates of the CGPM are closely related to the outcome of the CIPM discussion of the criteria for Associate status and will be considered after the decision taken by the CIPM on these criteria.

## **2.13 Relations with other bodies**

### **2.13.1 International Organization of Legal Metrology (OIML)**

The bureau of the CIPM met with members of the CIML Presidential Council during the annual liaison meeting in March 2008. The main business was a discussion on a closer long-term relationship between the BIPM and the OIML and the specific considerations of the options of a move of the BIPM to the BIPM site and in the longer term of a merger. The bureau took a very positive attitude to the proposals, believing them to be in the interests of the two organizations as well as to world metrology in general. The CIML, however, took the view that any co-location, irrespective of whether it led to a merger or not, would involve significant expense. They did not feel that they could commit OIML Member States' assets to help fund the move and the merger. Furthermore, their view was that any such proposal would be difficult to justify to their Member States in the absence of quantifiable benefits or any compelling reasons for a merger. Under these circumstances, they could not endorse any further steps. The bureau remains open to future discussions should the CIML change its view in the future.

#### 2.13.2 International Laboratory Accreditation Cooperation (ILAC)

Many of the initiatives taken in relation to the BIPM/ILAC relationship have already been mentioned. The bureau believes that the increasing closeness of the relationship and the excellent cooperation between the two bodies continues to be important.

#### 2.13.3 Versailles Project on Advanced Materials and Standards (VAMAS)

The BIPM has signed a Memorandum of Understanding (MoU) with VAMAS. This should facilitate the regular consultation on metrological needs by the “material properties” community and the BIPM and the CCs. The CCs have been asked to pay attention and make the necessary effort where traceability in the area of material properties has to be established on Consultative Committee level.

#### 2.13.4 United Nations Industrial Developments Organization (UNIDO)

An MoU facilitating closer cooperation between the BIPM and UNIDO is in preparation with respect to outreach activities on behalf of developing countries.

#### 2.13.5 World Meteorological Organization (WMO)

As already mentioned under 2.10.3 the cooperation with the WMO is developing further. In particular it is expected that the WMO will sign the CIPM MRA and bring in one or more of its reference laboratories.

In the field of greenhouse gases and volatile organic compounds (VOCs), close cooperation has been established with the CCQM and a number of NMIs delivering reference gases.

A BIPM-WMO Workshop on “Metrology and Climate Change” is in preparation, probably to be held in Geneva in the first quarter of 2010.

#### 2.13.6 World Health Organization (WHO)

Although on the scientific level the cooperation with the National Institute of Biological Standards and Control (NIBSC), the prime WHO laboratory, is

developing very well, it is still difficult to establish good contacts with the WHO in Geneva. The Director will plan another visit to the WHO headquarters in 2009. In the meantime, cooperation in the field of health care is developing very well with a number of organizations, including the IFCC, JCTLM and recently the Pharmacopeia.

#### 2.13.7 Codex Alimentarius Commission

As in many countries metrology in chemistry underpinning food analysis has the highest priority, the BIPM has built up a good relationship with the Codex Committee and the Inter-Agency Meeting, and regularly attends the relevant meetings.

#### 2.13.8 International Atomic Energy Agency (IAEA)

An MoU between the IAEA and the BIPM is proposed to ensure the existing long-term cooperation and broaden the cooperation into other fields of ionizing radiation measurements and chemical analysis of interest to the IAEA and the BIPM.

### 2.14 **Joint Committee for Guides in Metrology (JCGM): the VIM and the GUM**

The Director will report to the CIPM about the JCGM and its two working groups, on the International Vocabulary for Metrology (VIM) and the Guide on Uncertainty in Measurement (GUM), under §12. It is clear that the final stages of the publication of the VIM met with a number of difficulties and proved a frustrating process for the BIPM. Ultimately, the Director took the decision to proceed without the “revisable” text promised by the International Organization for Standardization (ISO) and to place the VIM3, after adoption, on the open BIPM website. After a number of corrections were made to the ISO published version, the BIPM published VIM3 as JCGM 200:2008. The full and complete copy made by the BIPM was made available to the JCGM partners.

## **2.15 The International Organization for Standardization (ISO), the International Electrotechnical Committee (IEC) and the decimal marker**

The situation with regard to the use of the point and the comma by ISO and IEC appears to have reached a stalemate. Progress had been made with various groups in IEC and ISO which have taken note of Resolution 10 adopted by the CGPM at its 22nd meeting. The ISO Technical Management Board accepted that the decimal marker could be either a point or a comma. The IEC's Standardization Management Board then discussed proposals to align ISO and IEC practice with that of other international organizations but agreed that ISO and IEC would set up a joint group to make a detailed analysis of the benefits, costs, possible solutions and risks of changing decimal marker practice. This group reported back to the ISO/IEC Coordination group in June 2008. The following is an extract from the minutes:

*“DRAFT MINUTES OF 20TH MEETING OF THE ISO/IEC JOINT COORDINATION GROUP OF THE TECHNICAL (MANAGEMENT) BOARDS (ISO/IEC JCG)*

*3 June 2008*

*It was reported that the ISO/TMB and IEC/SMB joint group had reviewed the ISO/IEC policy concerning the decimal marker and that further consultations in the USA had indicated that US industry does not consider the use of the comma to be a source of confusion amongst standards users. The discussions on this subject have accordingly ceased and ISO/IEC policy continues to be to use the comma as the decimal marker in both the English and French versions of International Standards.*

*Members noted with satisfaction that there would be no change to the policy”.*

Given this impasse and the survey of views of the US industry, it appears hard now to defend the CGPM position other than on political grounds.

## **2.16 Joint Committee on Traceability in Laboratory Medicine (JCTLM)**

The cooperation between the BIPM, IFCC and ILAC in the JCTLM is progressing in a very satisfactory way. As a result of some exchanges with the relevant part of the European Commission (EC), there is greater clarity about the specification standards which the EC will use to assess whether

*in vitro* diagnostic devices meet the requirement for “traceability to standards of a higher order”. The standards used by the JCTLM include those identified by the Commission and so it is clear that a listing in the JCTLM database implies consistency with the Commission’s requirements. This stops short of an endorsement of the JCTLM database and its citation by the Commission, but this is, we understand, difficult for legal reasons. Nevertheless it is a useful step towards helping industry have a clearly stated way of complying with the relevant EC Directive.

#### **2.17 Directors’ meeting**

The next meeting of directors of NMIs will be held in the second week of October 2009, together with the symposium to mark a decade of the CIPM MRA, immediately before the meeting of the CIPM.

#### **2.18 World Metrology Day**

On the occasion of World Metrology Day (WMD) on 20 May 2008, the Director again issued his promotional message. The 2008 theme was “No games without measurements”, capitalizing on the Beijing Olympic Games. The success of, and enthusiasm for, this event continues to surpass expectations. The BIPM is now working with a greater number of NMIs and other partners, the BIPM Director’s message was translated into 28 different languages, and 84 different language versions of the posters were produced. The BIPM received many reports of national events which were built around WMD and looks forward to expanding its impact and the number of collaborators in 2009 when the central theme will be the impact of nearly 10 years of the CIPM MRA.

The BIPM is grateful for the support received from the PTB, NMISA, NPL, and the NIM in developing the poster.

#### **2.19 Financial report**

The table below shows the situation of the assets of the BIPM, in euros, on 1 January of the year noted at the head of each column.

Account	2005	2006	2007	2008
I. Ordinary funds	6 656 826.81	7 405 481.57	8 035 603.86	8 564 535.51
II. Pension fund	11 260 670.61	11 872 421.60	12 088 858.38	12 359 859.62
III. Special fund for the improvement of scientific equipment	0.00	0.00	0.00	0.00
IV. Staff loan fund	217 347.38	229 312.25	238 715.51	248 729.00
V. Building reserve fund	0.00	365 499.97	114 602.35	0.00
VI. <i>Metrologia</i>	0.00	0.00	0.00	0.00
VII. Medical insurance reserve fund	586 449.25	581 222.28	555 390.57	523 843.30
Totals	18 721 294.05	20 453 937.67	21 033 170.67	21 696 967.43

Prof. Göbel thanked Dr Kaarls for his extensive and informative report and invited discussion.

Prof. Issaev noted that various difficulties had been encountered with the *International Vocabulary of Metrology* (“VIM3”). He recalled that the CIPM had previously discussed the difference in definition of “certified reference materials” between the VIM3 and that used by ISO REMCO, and expressed concern that other discrepancies had now arisen. He asked if another version of the Vocabulary needed to be produced. Dr Kaarls replied that he was optimistic that the difficulty with the definition of “certified reference materials” would be resolved in the near future, when ISO REMCO next reviewed the terms to be used in their vocabulary, and he was not aware of other big issues. Prof. Wallard invited Prof. Issaev to submit to the BIPM a list of his concerns. Prof. Issaev explained that in the final version of the vocabulary published by ISO on their website in January 2008, not all of the comments made by the VIM Working Group had been taken into account. He noted that these corrections had of course been incorporated into the version of the vocabulary published by the BIPM, document JCGM 200:2008, and he encouraged use of this version published on the BIPM website at <http://www.bipm.org/en/publications/guides/vim.html>.

Prof. Wallard commented that ISO had been informed of the problem they had caused by not taking into account the comments of the Working Group, and any further action would come from them.

Prof. Issaev noted that the full financial statements had not yet been distributed, but commented that the staff loan fund represented a very small part of the budget, and the special fund for improvement for scientific equipment was zero. He suggested this needed some explanation and asked why the budget for science was so small. Prof. Göbel deferred discussion of



the financial report to the relevant item of the agenda, for which Mrs Perent would be present (see §17). Dr Kaarls added that the bureau was working on plans to move from a cash to an accruals accounting system, which would result in a different way of presenting accounts in the future. This would be discussed later.

In answer to a question from Dr Hengstberger, Dr Kaarls confirmed that ILAC was preparing a document on the accreditation of NMIs. Dr Hengstberger then requested that when drafting the Memorandum of Understanding with the IAEA, the BIPM take into consideration the situation in the less developed States. He noted that, even if there was some cooperation at the top level, in many countries the IAEA laboratories operated in parallel with the national metrology institutes rather than fitting in with the metrology infrastructure. SADC MET had been planning to hold a workshop with the IAEA on this issue, and the workshop would probably now be organized by AFRIMETS. He recognized that for historical reasons in the developed countries, ionizing radiation standards are often held in separate laboratories from the NMIs. But in developing countries, there is no need for this situation to be perpetuated, especially when a new metrological system is being put in place. He cited as example the Tanzania Atomic Energy Commission (TAEC), which looks after radiation issues in Tanzania but is not a viable metrology institute in itself. However, the laboratory is maintained by the IAEA instead of being encouraged to combine with the NMI. He thought that the MoU would provide a valuable occasion to address this issue.

Dr Kaarls took note of Dr Hengstberger's concerns. He commented that the IAEA wished to sign an MoU with the BIPM to broaden and strengthen cooperation. There was not yet a draft text but he agreed that the situation in developing countries should be considered.

Dr Hengstberger then asked how the theme for Metrology Day was agreed. Prof. Wallard said that he usually proposed the theme, but he always asked for input. Next year the theme would be metrology and trade, to tie in with the celebrations of the ten-year anniversary of the CIPM MRA. Prof. Göbel added that suggestions were always welcome.

There were no further questions and Prof. Göbel turned to the next agenda item.

### **3 MEMBERSHIP OF THE CIPM**

Prof. Göbel noted that with 18 members the CIPM was currently complete. He asked if there were any planned resignations, and asked any member to get in touch with him or the Secretary privately if necessary. Although there were no current vacancies, the CIPM then briefly discussed future possible members in a closed session.

### **4 REPORT ON THE PRESENT STATUS OF THE CIPM MRA**

For this item of the agenda the CIPM were joined by Dr C. Thomas (Coordinator of the KCDB), Prof. L. Mussio (Executive Secretary of the JCRB), and Dr P.I. Espina (BIPM liaison with intergovernmental organizations and international bodies; former Executive Secretary of the JCRB).

#### **4.1 JCRB report**

Prof. Mussio, Executive Secretary of the Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB), presented a brief report on the activities of the Joint Committee (document CIPM/2008-41). He reported that the number of signatories of the CIPM MRA had increased over the last year, but that about a quarter of the signatories did not yet have CMCs listed in the KCDB.

Prof. Mussio presented four JCRB documents for approval, noting that three of them (CIPM/2008-41-a to CIPM/2008-41-c) represented compilations of the existing rules and formed mandatory documents for the JCRB: “Guide to the implementation of the CIPM MRA”, “Rules of Procedure for the JCRB”, and “CMCs in the context of the CIPM MRA”. On the fourth document, the proposed procedure for including a new RMO in the JCRB (CIPM/2008-41-d), he pointed out that the JCRB recommended a trial period of at least one year during which the new RMO would be able to voice its opinion but

not vote. He added that the JCRB recommended that the CIPM consider AFRIMETS not as a new RMO but as an expansion of the existing RMO, SADC MET.

Prof. Wallard apologized that these JCRB documents had only recently been made available to the CIPM, saying that the JCRB had met just two weeks earlier. He reminded the CIPM that the CIPM maintained the policy role. The CIPM had already approved the constituent documents of CIPM/2008-41-a to 41-c (respectively CIPM MRA-G-01 "*Guide to the implementation of the CIPM MRA*", CIPM MRA-D-01 "*Rules of procedure for the JCRB*" and CIPM MRA-D-04 "*Calibration and Measurement Capabilities in the context of the CIPM MRA*"), and these compilations were being presented for formal approval following the JCRB's rules of procedure. He suggested that these three documents probably required no further discussion, whereas CIPM/2008-41-d, on approving a new RMO, represented new policy and required more careful attention. He pointed out that it was essential for the established RMOs to have total confidence in any new RMO before accepting its CMCs.

Mr Énard reminded the CIPM that he and Dr Kaarls also attended the JCRB meetings and were aware of the contents of the documents. After very brief discussion, documents CIPM/2008-41-a, -41-b and -41-c were approved with no objections. Prof. Wallard confirmed that points of editorial concern would be addressed before their publication. Discussion on CMC/accreditation scope was deferred to §5.

Prof. Wallard then outlined the procedure proposed in document CIPM/2008-41-d, which suggests a two-tier approach to approving the entry of a new RMO into the JCRB, allowing initial entry on a no-CMC, no-voting basis, while trust was built up in their procedures and quality systems. He drew attention to the proposal that at least one member of the RMO should be a Member State of the BIPM, and added that no number had been fixed for the minimum number of States required to form an RMO. He said that the JCRB would consider this when the issue arose. Dr Kaarls agreed that the question should be left open for the time being.

Dr Hengstberger asked what would happen with GULFMET, which has no Member States of the BIPM. Prof. Wallard replied that this should prove an incentive for certain members of GULFMET to join the BIPM as Member States. Dr Bennett asked if the document would also apply to an RMO such as AFRIMETS, where the members were sub-regions rather than States. It

was agreed that the document should be reworded so that it did not presuppose any particular structure of the RMO.

Prof. Ugur asked whether the member of the RMO which was a Member State of the BIPM also needed to have an NMI that was active in the CIPM MRA. Prof. Mussio confirmed that it was not necessary for the NMI to have signed the CIPM MRA or have submitted CMCs before the RMO was accepted. Dr Kaarls reminded the CIPM that an NMI could sign the CIPM MRA without submitting its own CMCs; the CIPM MRA committed it only to accepting the calibration certificates of the other signatories.

Dr Schwitz commented that one year was probably the minimum trial period required.

It was agreed that certain parts of the document would be reworded and a revised version presented again towards the end of the meeting. Prof. Göbel encouraged members to read the document before then and submit to him any other comments.

Returning to the application of AFRIMETS, Prof. Wallard suggested that Mr M. Streak (on secondment at the BIPM from the National Metrology Institute of South Africa (NMISA) in the post of JCDCMAS Executive Secretary) should make a short presentation on AFRIMETS to the CIPM on Thursday morning; he invited members to submit their questions by midday on Thursday, so that if necessary the AFRIMETS Chairperson, Dr W. Louw, could be contacted and the answers presented to the CIPM on Friday morning.

Dr May asked why the internal operations of AFRIMETS were for the CIPM to discuss. Prof. Wallard noted that it was the CIPM's responsibility to approve the RMO as a member of the JCRB.

Discussion on AFRIMETS resumed on Thursday morning, when Mr Streak gave a brief presentation on AFRIMETS. Mr Streak explained the structure and the operating rules of AFRIMETS, noting that the working group structure within Technical Committee 1 (the technical committee most related to the CIPM MRA) mirrored that of the CCs, and included an additional WG on quality systems. The chairmen of the WGs are from NMIs that are active Members or Observers of a CC. These technical WGs will be responsible for organizing comparisons and CMC reviews. Membership of each WG will be open to one representative from each NMI, preferably NMIs operating in the specific field. The TC1 Working Group on Quality Systems will be responsible for the review and approval of NMI quality systems in

terms of the CIPM MRA. Membership of this WG will also be open to all the NMIs participating in the RMO. The delegation to JCRB meetings will include the Chairperson of AFRIMETS, the TC1 Chairperson, and the TC1 WG QS Chairperson, and in line with the terms of reference of the JCRB will not exceed five persons.

Dr Inglis checked that SADCMET would participate as a sub-region of AFRIMETS. Mr Streak confirmed that this was the case, and that through AFRIMETS the activities of SADCMET were being extended to the whole African continent. NMISA would continue to be an associate member of APMP but would submit its CMCs through AFRIMETS. He added that each State had to declare to which sub-region in AFRIMETS it adhered, and voting in the General Assembly was weighted according to the number of States represented by each sub-region.

Dr Schwitz asked how active the members of AFRIMETS were expected to be in the CIPM MRA. Mr Streak pointed out that the NMISA (South Africa) already has CMCs in the KCDB. Dr Hengstberger added that the Kenya Bureau of Standards (KEBS) had been accredited and its quality system had been approved, but it needed to obtain evidence from key comparisons before submitting its first CMCs. The same applied to the National Institute for Standards (NIS, Egypt) and the *Laboratoire Central d'Analyses et d'Essais* (LCAE, Tunisia). He foresaw a major migration of African NMIs towards the CIPM MRA over the next five to ten years.

Prof. Göbel noted that currently South Africa and Egypt are Member States of the BIPM, and Kenya and Tunisia are Associates of the CGPM.

Mr Streak said that AFRIMETS had a strategic plan concerning which technical activities would be put in place in which countries and on what timescale. This would enable the BIPM to know how best to serve this growing community. He noted that the plan would depend on the needs of the individual countries and would develop as AFRIMETS moved forward. Dr Hengstberger added that through the initiative of the European Union programme in the SADCMET region, most States would be starting with programmes in mass, volume, temperature, and dimensional metrology. The same strategy would probably be applied in the other sub-regions.

In response to a query from Dr Inglis, Mr Streak confirmed that the proposal was for AFRIMETS to replace SADCMET at the next meeting of the JCRB. Prof. Göbel noted that the bureau had discussed the application of AFRIMETS and were in favour, considering it a positive move in the light of

the BIPM's outreach programme. But before asking the CIPM to vote on this he asked Prof. Mussio to present the revised JCRB paper, which now included a response to earlier remarks, on the procedure for approval of the entry of a new RMO to the JCRB.

Dr Schwitz queried point 5 of the proposed definition of RMO, which specified that at least one member of the RMO should have the technical competence required to participate in CC activities. He asked if this applied to one or all of the CCs, and called for the original inclusive spirit of the CIPM MRA to be borne in mind, both in terms of key comparisons and the submission of CMCs. Dr Kaarls expressed concern that point 5 would in fact exclude GULFMET from applying. He pointed out that there are many countries that do not have an NMI in a CC. Dr Quinn agreed that the proposed clause about CCs set the barrier higher than for the participation of Associates, and recommended that it be deleted.

Prof. Wallard repeated that a two-stage process was being proposed. The proposed definition described the end state of the RMO to be achieved by the end of the trial period, before allowing it to vote in the JCRB. However, he agreed that the clause on technical competence could be deleted.

Dr Kaarls was concerned that there was confusion in the document about which criteria applied to which part of the process.

Prof. Issaev stressed that it was essential for at least one State within the RMO to have technical competence and be aware of the CIPM MRA procedures. He also asked if "preferably" could be deleted from point 6, saying that at least one State would need to be able to organize key comparisons.

Prof. Ugur reminded the CIPM that the document had political implications and merited careful consideration. He pointed out that individual States could become attached to an existing RMO, but if for political reasons States chose to form a new RMO they would have to assume the consequences. He was strongly in favour of maintaining the conditions on technical competence.

Prof. Göbel drew the discussion to a close, concluding that CIPM opinion on CIPM/2008-42-d was not unanimous, and asking the JCRB to reconsider the guidelines for approval of a new RMO. However, he called for a vote on the application of AFRIMETS to become the African continent's RMO in the JCRB, as an extension of the existing RMO SADC MET. The CIPM approved with no votes against, and Prof. Göbel said a letter of confirmation would be sent to Dr Louw.

Prof. Ugur suggested that the letter sent to AFRIMETS should include a sentence saying that the “existing structure does not cause problems”, but Dr Hengstberger argued that this had not been done for any of the other RMOs. He explained that some of the existing structures had been put in place simply to make AFRIMETS viable, pointing out that issues such as travel costs could be prohibitive to developing countries. It was agreed that there was no need to add a further clause.

## **4.2 Report of the KCDB**

Dr Thomas presented her report on the BIPM key comparison database (KCDB), CIPM/2008-14.

She presented detailed KCDB statistics, drawing particular attention to the large number of supplementary comparisons that had been registered over the last year. This reflected the RMO interest in posting the corresponding reports in the KCDB in support of CMC claims. She noted that 13 of the 27 Associates of the CGPM had not yet published CMCs.

Dr Thomas also drew attention to the success of the *KCDB Newsletter*, which is now distributed to thousands of e-mail addresses, by the BIPM, by NCSL International (NCSLI), and by the Collège Français de Métrologie (CFM).

Prof. Göbel thanked Dr Thomas for her report and congratulated her on the excellent work of the KCDB office.

Dr Hengstberger commented that he was not surprised that several Associates had not yet submitted CMCs. He noted that it takes a considerable length of time to complete the training, accreditation procedures, and participation in key comparisons necessary to prove competence. He was working through the process with the KEBS (Kenya), which was nearly ready to submit its first CMCs.

Dr Schwitz commented that the large number of comparisons represented a great deal of work around the world. He asked if there was any indication of what the repetition rate might be. Dr Thomas replied that this question was addressed within the Consultative Committees. To date only one key comparison (KC) has been repeated; this was on gas metrology, and the results of the second comparison superseded those of the first.

Dr May advised caution, noting that gas metrology was a particularly mature area, but it was important for participants in the initial comparison not be left out if they did not participate in the second round.

Dr Quinn expressed concern that the number of KCs was still increasing. He asked if the CIPM should perhaps try to reduce the number of key comparisons, given that ten years into the CIPM MRA a substantial amount of trust has already been built up amongst the participants. Prof. Wallard noted that metrology was constantly evolving and it was important to keep up; many of the comparisons starting now were addressing new fields. Prof. Ugur cautioned against the CIPM including more rules and pointed out that the CCs could be trusted to self-regulate on this question. Dr May agreed that the number of key comparisons was a self-correcting problem, and if the NMIs required new KCs they would organize them. Prof. Issaev added that NMIs are often interested in participating in new comparisons to demonstrate their own progress, as well as because they need to take into account changes in personnel.

Dr Quinn agreed that perhaps it was the proportion of time spent in key comparisons that should be limited, and asked what proportion of an NMI's time was used in KCs. This fraction had been estimated at about 15 % in the early years of the CIPM MRA. Prof. Göbel agreed that it was important to keep the workload under control.

Dr May suggested that the CC Presidents should include a report on "how they are managing KCs" in their presentations to the CGPM. Prof. Göbel agreed that it was indeed important for the CCs to consider this, although perhaps the meeting of the CGPM was not the best place to discuss it.

#### **4.3 Participation of intergovernmental organizations in the CIPM MRA**

Prof. Göbel then invited Prof. Wallard to introduce document CIPM/2008-05 on the participation of intergovernmental organizations in the CIPM MRA and the planned 2009 meeting of Directors of NMIs.

Prof. Wallard began by summarizing the situation with the World Meteorological Organization (WMO), noting that negotiations were continuing and the WMO was considering a draft "side letter" to the CIPM MRA, co-written by Prof. Wallard and Dr Len Barrie, co-Director of the WMO Research Department and Director of their Atmospheric Research and



Environment Branch. The side letter deals with the designation of various laboratories by the WMO.

Dr Quinn agreed that the subject was very important, pointing out that climate change is a subject of world-wide concern and yet most of the WMO GAW laboratories have a completely different culture, often without much link to the metrology community.

On the WMO designations, Dr Schwitz suggested that the wording should be adjusted because there are not regular links between EMPA and METAS. Prof. Wallard noted that relations with the US National Oceanic and Atmospheric Administration (NOAA) were being facilitated by Dr May.

Prof. Göbel thanked Prof. Wallard for his report and encouraged him to continue the negotiations to conclude the agreement.

#### **4.4 JCRB Recommendation on traceability of CMCs**

The CIPM noted the JCRB's recommendation that there should be a CIPM statement of policy on traceability of CMCs in the KCDB. The CIPM further noted a request from the 21st meeting of the JCRB for the CIPM to consider a number of amendments to the statement made during the 20th meeting of the JCRB. After discussion, the CIPM made the following statement.

For the purpose of publishing CMCs in the KCDB the following rules on traceability must be followed:

- A laboratory with primary realization of the units of measurement concerned, or applying primary "higher-order" methods, must declare traceability to its own demonstrable realization of the SI.
- A laboratory taking traceability from another laboratory must choose from either the BIPM or another laboratory having CMCs published in the KCDB with the appropriate level of uncertainty in the relevant area. In this case, the laboratory must still make a full assessment of the uncertainties involved in its measurement activity and must openly declare its chosen traceability route when submitting its CMCs for intra- and inter-regional reviews.
- A laboratory is free to use measurement services provided by laboratories accredited by a signatory to the ILAC Arrangement, for calibration of instrumentation, reference standards or other components as parts of its measurement systems, provided that it can be shown that

these components have only a minor influence on the total combined uncertainty of its CMCs.

Note 1: Paragraph 2 includes the case of laboratories using CRMs or high-purity primary chemical references obtained from sources that are not recognized under the CIPM MRA only when the NMI has the recognized capability to analyse the composition by itself.

## **5 BIPM/ILAC JOINT WORKING GROUP**

Prof. Göbel asked Prof. Wallard to present document CIPM/2008-06 on the activities of the BIPM/ILAC Joint Working Group.

Prof. Wallard commented that the BIPM's relationship with ILAC is both positive and productive. He noted that he had presented the joint activities with ILAC during the CIPM/BIPM Workshop on the Programme of Work (BIPM, 14 October 2008), and invited questions on his presentation or on the document CIPM/2008-06, which included the terms of reference for the Joint Task Group on the review assessment process.

Prof. Göbel mentioned a paper drafted by ILAC on the accreditation of NMIs, which will be presented to the CIPM at a later date. Prof. Wallard reported he had heard that ILAC considered the paper premature and its status at the ILAC General Assembly 2008 was being downgraded.

Dr Valdés wondered if accredited testing laboratories could also use the CIPM MRA to indicate traceability, even if they do not state uncertainties. He believed it important to discuss with ILAC the introduction of the CIPM MRA into these laboratories, rather than just discussing the accreditation by ILAC of NMIs.

Dr Kaarls concurred that, according to ISO/IEC 17025, accredited testing laboratories need to have traceability and, to date, this traceability is questionable, particularly in the chemical area. He agreed that it was important to convince ILAC to pay attention to this issue. He noted that ISO/IEC 17025 specified that the accredited testing laboratories should calculate their uncertainties although they did not necessarily need to publish this information. Again, this was a subject to raise with ILAC.

Dr May commented that testing laboratories have a pass/fail result without uncertainties, whereas NMIs measure quantities and state uncertainties. He suggested that as relations between the ILAC and the BIPM develop, their system should be made more like the BIPM's, and perhaps testing laboratories should have CMCs. Prof. Göbel agreed that this was a useful comment that should be passed to ILAC for consideration.

In answer to a query from Prof. Issaev, Prof. Wallard confirmed that the BIPM was collaborating with ILAC on the elaboration of two documents: P10 on traceability, and P9 on uncertainties.

## **6 REPORT ON STEPS TAKEN TO IMPLEMENT THE REPORT FROM DR BENNETT ON MATERIALS METROLOGY AND THE MoU WITH VAMAS**

Prof. Wallard presented document CIPM/2008-07. Dr Bennett added that the VAMAS prioritization process was under way and an annual report would be presented to the CIPM from 2009 onwards. Prof. Wallard reported that a signed copy of the MoU had been returned and would be distributed to CIPM members later in the week.

Dr Nava-Jaimes reported that CENAM was now a member of VAMAS. Prof. Göbel welcomed this news, saying it was good to have a direct link from the CIPM to VAMAS.

Dr Tanaka mentioned that he had met with Dr Graham Sims (NPL and Chair of VAMAS) to discuss aspects of materials metrology of interest to the CCM and he expected to receive proposals for an initiative to compare young's modulus measurements.

Dr Kaarls asked if the VAMAS report would indicate directions for the CCs to take. Dr Bennett said that he had not yet seen the document but that he presumed it would indeed be useful for the CCs.

Prof. Ugur drew attention to the clause on "Settlement of disputes", asking what sort of disputes were foreseen. Prof. Wallard commented that this clause was a standard clause included on the advice of the legal advisers at the BIPM and VAMAS. He very much hoped that it would not be needed.

Prof. Göbel thanked Prof. Wallard for the report and welcomed the progress made. A proposal to produce a special issue of *Metrologia* on materials metrology was discussed under §13.

## **7 PRESENTATION OF THE BIPM SCIENCE PROGRAMMES AND LABORATORY VISITS**

During the morning of 15 October 2008, Prof. Wallard and the heads of the BIPM's scientific sections gave talks on progress since their last presentations to the CIPM, in October 2006. During the afternoon the CIPM split into two groups, each of which visited half of the BIPM laboratories, being those laboratories they had not visited in 2006. The talks and visits were much appreciated. Dr May voiced his strong support for the BIPM's programme in organic chemistry, commenting that through a judicious choice of target molecules the programme underpinned all measurements in organic chemistry.

### **7.1 Depository of the metric prototypes**

The visit to the depository of the metric prototypes at the Pavillon de Breteuil took place at 17:15 on 15 October 2008, in the presence of the President of the CIPM, the Director of the BIPM, and the representative of the Curator of the Archives de France.

The three keys necessary to open the depository were assembled: the key entrusted to the care of the Director of the BIPM, the one deposited at the Archives Nationales in Paris, brought by Mrs C. Béchu, and finally the one kept by the President of the CIPM.

The doors of the vault and the safe having been opened, the presence in the safe of the international prototype of the kilogram and its official copies was verified.

The following indications were noted on the measuring instruments placed in the safe:

temperature	19 °C
maximum temperature:	19 °C
minimum temperature:	19 °C
relative humidity:	50 %

The safe and the doors of the vault were then locked.

The Director of the BIPM,	For the Curator of the Archives Nationales,	The President of the CIPM,
A.J. Wallard	C. Béchu	E.O. Göbel

## 8 INTERNATIONAL SYSTEM OF UNITS (SI)

### 8.1 The SI and possible redefinitions of the units

Prof. Wallard presented document CIPM/2008-09 on the SI and possible redefinitions of the units. In particular he noted that the NPL (UK) had reported new measurements of the Planck constant  $h$  using their watt balance; their stated uncertainty was now smaller than their previous report but both results differ from that of the NIST by more than the stated uncertainties. The NPL result is slightly toward that of the silicon Avogadro approach, the latest results of which are still 1 part in  $10^6$  away from the watt balance results. Although the International Avogadro Coordination (IAC) is making good progress, no new results are expected until late 2009.

He concluded that there was still not satisfactory convergence of the results from watt balance experiments and from the IAC, and expressed doubt that the CCM's criteria for a redefinition of the kilogram would be met in time for a redefinition in 2011. Clearly The Avogadro results will be important. If the CIPM maintains its current policy that all four units should be redefined at the same time, then the *status quo* is likely to exist for some time to come.

See also the report on the IAC under §9.5.

## **8.2 BIPM Workshop on Physiological Quantities and SI Units**

Prof. Wallard drew the CIPM's attention to a Workshop on Physiological Quantities and SI Units to be held at the BIPM in 2009. He noted that the subject is a difficult one, with a number of disparate stakeholders as well as some entrenched opinions and approaches. The BIPM is far from expert in the details but a number of NMIs have ventured into the field and their participation will be important in making progress and achieving success. This activity aims to capture the commitment of the standardization bodies, and the plans are moving forward with the aim of creating a working group (Secretary Dr Thomas (BIPM); Chairman to be nominated) which will report to the JCGM and to the CCU.

Prof. Wallard concluded by informing the CIPM that he had also been approached with a request to establish collaboration with European initiatives on "soft metrology" and similar work.

Prof. Göbel invited members to send Prof. Wallard any suggestions concerning topics to be included or participants to be invited to the Workshop. Dr Kaarls commented that it was an important activity, and he welcomed it. Prof. Mills commented that it was essential that the appropriate people be recruited to the working group. Prof. Göbel asked Prof. Mills to consider this issue and make any nominations.

## **9 REPORTS FROM CONSULTATIVE COMMITTEES**

For this item of the agenda, the CIPM were joined by Dr Allisy-Roberts, Dr Arias, Dr Davis, Mr Felder, Dr Stock, Dr Thomas, and Dr Wielgosz, Executive Secretaries of the CIPM's Consultative Committees.

### **9.1 Consultative Committee for Amount of Substance – Metrology in Chemistry (CCQM)**

Dr Kaarls, President of the CCQM, made a presentation of the work of the CCQM, described in his report CIPM/2008-10. The CCQM and its seven working groups continue to be very active, and interest in its work continues to increase. High-priority areas include: food analysis; analysis in healthcare

(diagnostics, therapeutics, pharmaceuticals); environmental measurements; and purity analysis. The CCQM currently has three additional *ad hoc* working groups: on the KCRV and its uncertainty, chaired by Prof. M. Cox (NPL); on efficient and effective testing of CMC claims, chaired by Dr G. Turk (NIST); and on the redefinition of the mole, chaired by Dr M. Milton, NPL.

Dr Kaarls reported on the meetings and activities of all the different groups, as well as the work of the BIPM Chemistry Section and the JCTLM.

Prof. Göbel thanked Dr Kaarls for his report and congratulated the CCQM on the enormous amount of work accomplished. He invited questions.

Prof. Issaev asked if there was industrial support for the CCQM studies on biofuels. Dr Kaarls said that it was too early to attract financial support, but noted that various industrial companies would be present at a forthcoming meeting on Biofuels and Metrology, to be held in Strasbourg on 6-7 November 2008, organized jointly by LNE, PTB and the Collège Français de Métrologie.

Dr Inglis asked how the interest of the Pharmacopoeias had arisen. Dr Kaarls explained that this had grown through the strong support of the US Pharmacopeia. He welcomed the forthcoming CCQM Pharmacopeia Workshop on Measurement Traceability for Pharma and Bio-pharma Measurements, which will take place at the BIPM in December 2008. Dr Wielgosz added that the biggest support for a global system comes from industry. At present there are national and regional standards, so an international pharmaceutical company has to have its pharmaceutical products tested by many different bodies.

Dr Hengstberger asked if there was also “measurement in chemistry” activity on the RMO level. Dr Kaarls noted that there was an increasing amount of work at the RMO level in gas metrology, but because of the cost of producing samples in other areas it was better to hold comparisons on the global level. Dr May added that in some areas of chemistry it is relatively easy to send out samples at the same time to participants around the world. However, when a later comparison is held on a different sample, it is not clear how to link the results. He was wary of simply generating a “correction” for a matrix, when it is clear that every matrix is different.

Dr McLaren observed that of all the certified reference materials (CRMs) listed in the KCDB, only about 10 % are pure substances used to calibrate measurement techniques, and the remaining 90 % are materials used to

validate a method. He noted that a sediment certified for trace elements, for example, is not used to calibrate a method but to validate it. Dr McLaren considered it important to clarify the nuance between these two types of CRMs, and suggested that we should talk about dissemination of measurement capability rather than dissemination of traceability. Dr Kaarls agreed that there was confusion in this area, and validation and calibration were not the same thing.

Prof. Issaev asked if the CCQM had a special guide on how to calculate a KCRV. Dr Kaarls noted that the same principles were applied as for all other key comparisons, but the way in which the KCRV was calculated depended strongly on the type of comparison. Although harmonization of the process was encouraged, there needed to be a case-by-case study of the statistical analysis of the results.

Prof. Göbel concluded the discussion by thanking Dr Kaarls again.

## 9.2 Consultative Committee for Units (CCU)

Prof. Mills, President of the CCU, presented the report CIPM/2008-34, summarizing the current advice of the CCU on the future redefinitions of the units. He noted that the CCU had not met since his presentation during the meeting of the CGPM in November 2007. The next meeting of the CCU, in May 2009, would consider possible ways of wording the new definitions and the accompanying *mises en pratique*. For this reason the CCU would like to see and have an overview of the texts of the *mises en pratique* produced by the various CCs, adding that the CCU would like to see some homogeneity in their content.

Prof. Mills noted that there was wide interest from the scientific community and he had made many presentations on the subject during the year. He welcomed this interaction with the user community and encouraged discussion on the redefinitions as widely as possible, underlining the need when drafting words to produce something that is easy for scientists to understand.

Prof. Göbel thanked Prof. Mills for his report and commented that it was perhaps too early to ask for the wording of new *mises en pratique*, because these would depend on the choice of definitions. Prof. Wallard suggested that Prof. Mills ask the CC Presidents for reports “on progress towards a *mise en pratique*”, and Prof. Mills agreed to do so.



A discussion ensued on what was meant by a *mise en pratique*, and to which audience the *mise en pratique* should be addressed. The CIPM agreed that a *mise en pratique* for the definition of a unit was a set of instructions that allowed the definition to be realized in practice at the highest level; the *mise en pratique* should be a primary realization, including only top-level primary methods. Lower level realizations could be included in accompanying texts on a case-by-case basis. The CIPM did not favour the inclusion of working level realizations (for example mercury-in-glass thermometers).

Mr Felder, Executive Secretary of the CCL, pointed out that the recent inclusion of unstabilized lasers into the list of radiations approved for the realization of the metre had led to problems. Although there had been a strong call for their inclusion from the user community, the use of unstabilized lasers did not in fact permit the realization of a metre at the highest level. It was recognized that although it might sometimes be useful to include additional information of interest to the user community, it should be clear whether this additional information did or did not permit realization of the unit at the highest level.

Prof. Issaev informed the CIPM that a Monography entitled “Metrology and Fundamental Physical Constants” had been published by Dr Kononogov, Director of the VNIIMS, with a view to informing the scientific and engineering communities in the Russian Federation about the future changes to the SI. He encouraged this endeavour, and said he hoped that an English version of the text would also be produced.

### **9.3 Consultative Committee for Acoustics, Ultrasound, and Vibrations (CCAUV)**

Dr Valdés, President of the CCAUV, presented a report (CIPM/2008-48) on the recent meeting of the CCAUV, held at the BIPM on 9 and 10 October 2008. He welcomed the presentations on the activities of the member laboratories, which had demonstrated the continuing vitality of research in the area of acoustics, ultrasound and vibration. He noted that CIPM MRA-related activities were also in a healthy state of affairs, and the NMIs were pleased with progress.

He then drew attention to some recent news of concern to the CCAUV. Apparently the IEC are discussing the introduction of fractional decade frequencies in place of fractional octave frequencies. Dr Valdés pointed out that it is essential for the BIPM, CIPM and CCs to be aware of such changes

in standards, because there are consequences for key comparisons. Dr Inglis said he hoped that the IEC had thought the matter through carefully, as it represented a big change.

Dr Hengstberger asked if the CCs could not be represented on the IEC so that such recommendations did not come as such a surprise, and Dr Valdés confirmed that Dr Rasmussen (DFM) participated in both committees. Prof. Issaev suggested that a letter should be addressed to the IEC reminding them that the BIPM should be involved in the decision-making process. Prof. Göbel noted that this matter could be addressed in the forthcoming Workshop on Physiological Quantities and SI Units.

Dr Tanaka drew attention to another area in which he believed the help of the metrological community was required. He explained that safety inspections of pipeline and pressure vessels, such as in a nuclear plant, relied on testing and diagnostics by acoustic devices. Problems were encountered in this field with the estimation of uncertainties and the establishment of traceability, and he pointed out that national accreditation bodies did not always have expertise in the domain and were not necessarily accepted by the nuclear regulation authorities. He called for the BIPM to establish a means of disseminating traceability for these measurements.

Along similar lines, he noted that both the Swedish and the Japanese nuclear authorities were currently discussing traceability for the flow measurements of cooling water for nuclear plants. This was an area in which perhaps the BIPM could help, through collaboration with the IAEA.

He remarked that in the chemical field the dissemination of traceability to the SI through the use of reference materials was conceptually easy to put into practice (the main concern being the reliability of the reference materials). However, in the physical field the means of establishing traceability was often more complicated to understand, and the help of the metrology community was needed.

Dr Valdés thanked Dr Tanaka for his input and commented that the testing laboratories undertaking the measurements were accredited for their measurement capability, but generally without any statement of uncertainty; this meant that they were not able to claim traceability.

Prof. Wallard responded to the IAEA question, which he agreed was an interesting point. He noted that until recently the USA had only used their own nuclear regulators and laboratories, although in some areas they did now also accept testing in accredited laboratories.

#### 9.4 Consultative Committee for Thermometry (CCT)

Prof. Ugur, President of the CCT, presented the report of the CCT (CIPM/2008-43).

He drew attention to the CCT's decision to adopt three procedures for the submission of working documents, commenting that this might be of interest to other Consultative Committees. The CCT had agreed on three routes: if the author is a member of a working group, documents are to be submitted through the working group chair; if the author is part of a delegation, the document should be submitted to the Executive Secretary, to the President of the CCT, or through a working group chair; if the author is not part of a delegation, then the document should be submitted through the head of a delegation present at the meeting.

Prof. Ugur drew attention to the CCU's decision to include the "blue book" and "red book" on the BIPM website, and noted that these two publications were currently being updated.

He noted that when Dr Semerjian was a member of the CIPM he had drawn attention to a conflict between two RMOs on CMCs in thermometry. The response from the CCT was included in the report CIPM/2008-43, and no further action was required, either by the President of the CCT or by the CIPM. He asked the CIPM to clarify who can participate in CIPM key comparisons and to clarify the CCT's mission statement. Finally he pointed out that the next meeting of the CCT, in 2009, would be Dr Davis' last meeting as CCT Executive Secretary; he requested that a new Executive Secretary be nominated as soon as possible, so that s/he could overlap with Dr Davis at the 2009 meeting.

Prof. Göbel thanked Prof. Ugur for his report and invited questions.

Prof. Issaev asked about the status of the CIPM key comparison CCT-K6, on humidity standards, commenting that there were three institutes in the Russian Federation working in this area. Prof. Ugur hoped that the Draft A report on CCT-K6 would be completed in time for discussion at the CCT meeting in May 2009; he was not aware of any problems. Dr Davis added that VNIIM and VNIIFTRI were official members of the CCT Working Group on Humidity Measurements, CCT-WG6.

Dr Kaarls highlighted the importance of chemistry in a wide range of fields, and invited the CCT to produce a note for the CCQM on where the major

problems lie, including isotope ratios and where material impurities raised specific problems where the CCQM may be of assistance.

On the mission statement, Dr Kaarls commented that a draft of a paper on the working practices of the Consultative Committees had already been produced by the BIPM, and the general remit of the Strategy Working Groups was being worked on before being presented to the CIPM again. Dr Wielgosz responded that it had proved very difficult to produce a general document, because the Consultative Committees were not homogeneous; each used its own procedures and structure. The document was being finalized by Dr Allisy-Roberts, and Prof. Göbel hoped that it would be ready for discussion at the next meeting of the CIPM.

Dr Davis highlighted progress towards absolute thermometry, saying that a three-day International Workshop on Progress in Determining the Boltzmann Constant will be held at the INRIM in September 2009. The CCT Task Group on the SI (TG-SI) emphasized the need to have primary thermometry experiments performed by different methods, not only acoustic thermometry; this was important for  $T - T^{90}$  and also for the kelvin. Dr Valdés added that a number of CCs were interested in the results of the Boltzmann experiments.

Prof. Göbel asked if the CIPM foresaw a need for a new temperature scale ITS-XX; in his view it was not needed. Dr Quinn mentioned that he would be presenting a keynote lecture on exactly this topic in Beijing on 20 October 2008. He also believed that no new scale would be needed. Prof. Ugur added that studies were being carried out for the first time on the economic impact of changing the temperature scale. It was agreed that no new action was needed at present.

On the appointment of a new Executive Secretary, Prof. Wallard commented that this was an internal matter for the BIPM and it would be addressed in due course.

## 9.5 Consultative Committee for Mass (CCM)

Dr Tanaka, President of the CCM, presented document CIPM/2008-32, summarizing the work of the CCM and its working groups, and presenting the terms of reference of the new groups that had been formed. He then reported on the status of the IAC, where the total combined standard measurement uncertainty has now reached 5 parts in  $10^8$ . He noted that new experimental methods for determining the molar mass had been established at

the PTB and at the Institute for Mineral Resources (IMR, Beijing), and a new task group had been established to reanalyse the molar mass measurements made at the IRMM. The latest results indicated a 1 part in  $10^6$  correction of earlier results, and if these preliminary results were confirmed then this was a step towards reducing the discrepancy between the Avogadro and watt balance results.

The CIPM welcomed the news. It was agreed that it was too early to quote the results, but in upcoming talks on the new SI it could be reported that the “deviation (between the watt balance and Avogadro results) was being reanalysed in the light of new measurements”.

Prof. Göbel cautioned against celebrating the Avogadro result before it was published. The IRMM was revising the results it had obtained on silicon molar masses and the PTB (Germany) was planning to make an independent measurement.

Dr Wielgosz commented that the isotope measurements involved were extremely difficult, and had not yet been addressed at this level by the CCQM.

#### **9.6 Consultative Committee for Photometry and Radiometry (CCPR)**

Dr Hengstberger, President of the CCPR, reminded the CIPM that the CCPR meets every two years, and its Working Groups meet every year. The last meeting of the CCPR took place in June 2007 and a full report on its working programme at that stage was delivered to both the CIPM and the CGPM in the same year.

Three of the CCPR Working Groups will meet at the occasion of the NEWRAD2008 conference in the Republic of Korea.

#### **9.7 Consultative Committee for Electricity and Magnetism (CCEM)**

Dr Inglis, President of the CCEM, reported that the CCEM had not met since the previous meeting of the CIPM. He noted that a preliminary report on future challenges in electromagnetic metrology was being prepared by the CCEM Working Group on Strategic Planning; this report would be considered at the next meeting of the CCEM (in 2009), and would subsequently be presented to the CIPM.

**9.8 Consultative Committee for Time and Frequency (CCTF)**

Mr Énard, President of the CCTF, reported that although there had been no meeting of the CCTF, its members had continued to be active. Three of the CCTF Working Groups had met during the 2008 meeting of the European Frequency and Time Forum (EFTF) in Toulouse, France.

He reported that COOMET and SADC MET (now part of AFRIMETS) had not yet appointed representatives as members of the CCTF Working Group on the CIPM MRA.

**9.9 Consultative Committee for Length (CCL)**

Dr Sacconi, President of the CCL, noted that the CCL had not met since the last meeting of the CIPM. He reminded the CIPM that the CCL and CCTF had recommended that future meetings of the two Committees be synchronized. In particular, this would facilitate approval of changes to the unified list of frequencies as recommended by the CCL-CCTF Frequency Standards Working Group. This should be borne in mind when the dates for 2009 were set under §9.12.

**9.10 Consultative Committee for Ionizing Radiation (CCRI)**

On behalf of Dr Carneiro, President of the Consultative Committee for Ionizing Radiation (CCRI), Dr Allisy-Roberts, Executive Secretary of the CCRI, spoke briefly about the recent activities of the Committee and the proposed celebrations for the 50th anniversary of the CCRI in 2009.

**9.11 New Members and Observers of Consultative Committees**

The following changes were approved:

CCAUV	INM as Observer
CCL	CEM as Member
	NPLI as Member
CCM	A*STAR as Observer
	BEV as Observer

CCQM	CITAC as Observer
	INPL as Observer
CCRI	CNEA as Observer of Sections I and II
CCT	CENAM as Member
	MIKES as Observer
	NIS will be invited as Guest to the next meeting of the CCT
CCTF	NMISA as Member

### 9.12 Dates for future meetings

CCEM and WGs	9-13 March 2009
CCQM and WGs	17-18 April 2009, and whole of the following week
CCT	4-7 May 2009*
CCRI (I) and (III)	week 11-15 May 2009
CCU	26-28 May 2009
CCTF, CCL and associated WGs	1st two weeks of June 2009
CCRI (II) and CCRI	3rd week of June 2009
CCPR and WGs	14-18 September 2009
CIPM	12-16 October 2009
Directors' meeting	7 October 2009
Symposium for the 10 years of the CIPM MRA	8-9 October 2009
Dates for 2010:	
CCU	13-15 September 2010
CIPM	11-15 October 2010

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\* The meeting of the CCT in 2009 was subsequently rescheduled for 2010.

## **10 JOINT COMMITTEE FOR TRACEABILITY IN LABORATORY MEDICINE (JCTLM)**

Dr Wielgosz, Executive Secretary of the JCTLM presented the report CIPM/2008-11 on the activities of the JCTLM during 2007–2008. The major deliverable of the JCTLM is the JCTLM Database of Higher Order Reference Materials, Methods and Measurement Services ([www.bipm.org/jctlm/](http://www.bipm.org/jctlm/)), the development of which is coordinated at the BIPM by Dr S. Maniguet. The JCTLM Database currently contains 226 certified reference materials (CRMs) of higher order; 146 reference measurement methods; and 111 reference measurement services offered by laboratories. The data are updated on a yearly cycle.

Dr Wielgosz noted that reports of meetings of the JCTLM Executive Committee are available on the BIPM website. A JCTLM symposium on “Activities and Challenges for Traceability and Standardization in Laboratory Medicine” took place in Beijing in October 2007, organized in collaboration with colleagues from the NIM and the NIST and attended by over 300 delegates. A JCTLM workshop on “Identifying the Needs of the IVD Industry for Higher Order Reference Materials and Measurement Procedures for Nucleic Acid Testing and Immunodiagnosics” was organized by colleagues at the NIST in July 2008.

Dr Kaarls commented that the JCTLM was a success story, and the database was used and appreciated by the diagnostics industry. He noted that the NIST participated in the Joint Committee and called for increased input from the other NMIs.

Dr Hengstberger asked in what way the reference measurement services listed in the JCTLM-DB differed from the CMCs published in the KCDB. Dr Wielgosz replied that in general the reference services listed in the JCTLM-DB are provided by accredited laboratories, whereas only NMIs can publish CMCs in the KCDB.

Dr McLaren asked how the new versions of ISO 15194 and 15193 affected the JCTLM’s nomination cycle. Dr Wielgosz explained that ISO Guide 34 was now a normative reference and new nomination documents had been developed.

Prof. Issaev asked if the work of the JCTLM required new units. Dr Wielgosz replied that well-defined cases cause no problems. However, the quantity of



interest for biologicals was activity, and to establish the relationship between amount and activity for heterogeneous analyses was a considerable challenge. He noted that the Joint Committee had been very successful with “SI-type” measurands, but less successful with other “non-SI” measurands.

## **11 CONTACTS WITH OTHER INTERGOVERNMENTAL ORGANIZATIONS AND INTERNATIONAL BODIES**

Prof. Wallard noted that a full report on the BIPM’s activities with numerous organizations was available in CIPM/2008-12 and he would just highlight a few areas for the CIPM’s attention.

### **11.1 OIML**

Prof. Göbel noted that the Secretary’s report had dealt with the status of the discussions with the OIML.

### **11.2 WMO**

Prof. Wallard noted that the situation concerning WMO with respect to the CIPM MRA had already been presented (see §4.3). He hoped that the Joint BIPM–WMO Workshop on Climate Change would finally be organized for 2010, to be held in the WMO premises. He noted that registration fees for the meeting had not yet been fixed.

### **11.3 UNIDO**

Prof. Wallard informed the CIPM that an MoU had been negotiated between the BIPM, the OIML and UNIDO over the last year and would be signed on 2 December 2008. He noted that UNIDO is one of the partner organizations of JCDCMAS and its relationship with the BIPM has grown out of that. UNIDO is a large intergovernmental organization with a significant budget for “capacity building”. A number of discussions have taken place, and UNIDO has consulted the BIPM on its views on priorities in developing and

emerging Economies and States. UNIDO has recently agreed to draw up a programme of about 0.5 million US dollars to directly benefit regional activities in AFRIMETS, to help the NMIs develop their competences and prepare for participation in the CIPM MRA. Additionally, UNIDO is proposing that ten States will receive financial support to help them become Associates of the CGPM.

Prof. Göbel queried UNIDO's rationale for helping States become Members of the BIPM or Associates of the CGPM. Prof. Wallard explained that UNIDO's goal was to help NMIs sign the CIPM MRA, and hence reduce barriers to trade.

Dr Valdés drew attention to the fact that UNIDO operates through a system of donor countries, and regular reports on the advancement of the project have to be submitted to the donor country, on at least an annual basis. Prof. Wallard confirmed that the donor country had been identified in the current case. Dr Valdés asked why the donor country could not operate directly or through the BIPM rather than through UNIDO. He also asked if the interaction with UNIDO was being managed at the cost of the BIPM. Prof. Wallard replied that a two-page proposal had been written but it was not the BIPM's role to try to find sponsors and the BIPM did not have the resources to do this. Prof. Wallard understood that the agreed financing would go directly to the organizations concerned, with some support to the BIPM towards its ongoing support for AFRIMETS. UNIDO would help organize joint workshops and training programmes.

Dr Valdés noted that through UNIDO a donor country had contributed 0.5 million US dollars to help develop the metrological infrastructure within Argentina.

Prof. Ugur added some complementary information on UNIDO, saying that it had already supported metrology projects in between 10 and 15 countries, and each project typically represented between 0.5 million US dollars and 1 million US dollars. UNIDO operates through chains of projects; before one project is completed another is prepared. Prof. Ugur noted that as long as the project line is successful, a sum of 5 million US dollars might be received over five or six years. Prof. Wallard commented that responsibility for renewing the current project would have to be assumed at the regional level.

Dr Schwitz commented that UNIDO was a useful organization and presented a good platform for metrology. He noted that UNIDO had contacts on the ground level, which is often what the BIPM was missing. Prof. Göbel

commented that it also had the funding, so it was important for the BIPM to ensure that the BIPM projects were fulfilled, not those of UNIDO.

Mr Énard agreed that it was important to know where the money was going (to the AFRIMETS secretariat) and what the objectives were.

The discussion on relations with UNIDO was continued under discussion on the JCDCMAS (see §11.6).

#### **11.4 IAEA**

Prof. Wallard drew the CIPM's attention to document CIPM/2008-43, reporting that representatives of the BIPM and the IAEA had discussed the desirability of an MoU between the BIPM and the IAEA, with the aim of confirming and strengthening the cooperation between the BIPM and the IAEA. A draft text is being prepared by the IAEA.

Dr Kaarls noted that the IAEA is an active member of the CCQM, and two of the CCQM Working Groups recently had their meetings hosted by the IAEA in Vienna and Seibersdorf, Austria. He noted that the IAEA has rolling staff, which can cause difficulties when trying to establish a long-term relationship with them. Dr Allisy-Roberts pointed out that, despite the continual turnover in the IAEA's staff, the staff stability on the BIPM's side has meant that the BIPM has successfully maintained close relations with the IAEA over the last 50 years.

Dr Tanaka added that the CCM-WGFF also interacted with the IAEA concerning the importance of flow metrology in calculations concerning cooling water.

The CIPM had no objections to Prof. Wallard continuing these negotiations with the IAEA. Prof. Wallard said that he would bear in mind Dr Hengstberger's earlier comments as well as Dr Tanaka's comments concerning the IAEA and nuclear regulatory issues.

#### **11.5 NCSLI**

Prof. Wallard noted that the annual NCSLI Conference is a useful event and said that the NCSLI values its link with the BIPM and fully appreciates its role and work. This is important, because the NCSLI represents the voice of industry. The NCSLI vigorously promotes World Metrology Day, and paid

for posters and a number of web-based activities; it also printed, at its own expense, copies of the new BIPM brochure in the North American format for distribution to all their members, and is working closely with the BIPM to promote the SI and the mission of the BIPM.

## 11.6 JCDCMAS

Prof. Wallard reminded the CIPM that the work of the JCDCMAS is reported in document CIPM/2008-20. He acknowledged that the body had limited influence, and commented that the JCDCMAS remains realistic about its objectives. He pointed out that the main objective of the BIPM was to ensure that metrology was featured in events organized by the JCDCMAS partner organizations, and that an integrated metrology–accreditation–standardization message was presented. The BIPM is providing the secretariat for the JCDCMAS for a two-year period from April 2008.

Prof. Göbel highlighted the lack of a common budget, saying this had always been the sticking point. Dr Espina commented that the success of the application to UNIDO for funding was partly due to the BIPM being a member of the JCDCMAS.

Prof. Göbel commented that it is in the interest of the BIPM and CIPM to bring in more States to the community to promote the use of the SI and for this it is important to have even if an outreach programme limited. Dr Quinn agreed, but said that the level of the BIPM's expertise was with the regional bodies, not at the national level.

Dr Kaarls commented on the clear need of developing countries to reduce technical barriers to trade. His experience is that if staff of the BIPM attend the relevant meetings, then this is very beneficial. He agreed we need to be careful, but did not have negative views about the programme.

Dr Hengstberger said that initially he had also been uneasy about UNIDO, because some of their projects are imposed without having consulted the users. However, they have other projects too, and their funding, previously mainly directed to standardization, and then later to accreditation, has recently evolved towards metrology projects. This progress is largely due to UNIDO's involvement in the JCDCMAS, and a direct consequence of the BIPM interacting with them at the top level. The BIPM should not underestimate the importance of this funding to the developing countries. He

considered it a very good thing that the BIPM became involved and communicated with UNIDO at the top level.

Prof. Wallard commented that he was very well aware of his position as Director and the authority given to him by the CIPM and the CGPM. He confirmed that the money from this particular UNIDO project would be going directly to the AFRIMETS Secretariat and thus directly to the people who will benefit.

Dr Inglis was wary of the amount of resources required for all the BIPM's liaison activities: he noted that currently nearly 20 % of staff activity at the BIPM is related to liaison activities. Criteria had been set for assessing the priorities of the different scientific programmes but he was not aware of criteria used to assess the priorities in liaison activities. It was essential to keep a close eye on the aims and results of all liaison activities as the BIPM has limited resource for this. Prof. Wallard commented that at least 75 % of the 19 % of staff time used in such activities was direct scientific liaison, and confirmed that he was operating on the criteria already set by the CIPM for liaison work and the broad direction agreed by the CGPM.

Mr Énard called for criteria, resources, and milestones to be set in the selected programmes, so that progress could be monitored.

Prof. Göbel thanked the members for their discussion and said he would be interested to hear the JCDCMAS report in a year's time.

## **12 JOINT COMMITTEE FOR GUIDES IN METROLOGY (JCGM)**

Prof. Wallard presented document CIPM/2008-13, reporting the publication of the new edition of the *International Vocabulary of Metrology* (VIM), and Supplement 1 to the *Guide on the Expression of Uncertainty in Measurement* (GUM). He drew the CIPM's attention to the fact that both "VIM3" and the Supplement 1 are available for download free of charge from the BIPM website (see [www.bipm.org/en/publications/guides/](http://www.bipm.org/en/publications/guides/)), where they are referred to as JCGM 200:2008 and JCGM 101:2008, respectively.

The publication of these documents had been discussed after the Secretary's report (see the end of §2.14), and there were no further comments from the §2.14 CIPM. Dr Wielgosz pointed out that the JCTLM had recognized a need for pragmatic language in the field of biological metrology and wondered if the JCGM could take this on.

## 13 METROLOGIA

Dr Williams presented a brief report on *Metrologia*, noting that the changeover of the journal's secretariat from the BIPM to IOPP has been very smooth and that the arrangement with the IOPP was working well. He informed the CIPM that the last issue of 2008 was to be a special issue on time scales, and a special issue on dosimetry would be published in 2009.

Dr Inglis congratulated Dr Williams on the increase in impact factor, which stands at 1.667 for 2007, compared to 1.314 for 2004.

Dr Valdés raised the possibility of publishing a special issue on materials metrology. Dr Williams thanked him for the suggestion and commented that it would be important to identify a specialist editor and agree topics, authors, referees, and a timescale. It was agreed that Dr Bennett and Dr Valdés would collaborate as joint editors for this issue. Prof. Wallard welcomed the initiative, commenting that it would draw the attention of the materials community to *Metrologia*.

Prof. Wallard informed the CIPM that Dr Williams would be leaving the BIPM at the end of November but said that the BIPM would continue to work with him. On behalf of the BIPM and the CIPM he expressed his thanks to Dr Williams for his achievements with the journal.

## **14 FOLLOW-UP FROM THE 23rd MEETING OF THE CGPM**

### **14.1 Prioritization of the BIPM's work programme**

Prof. Wallard highlighted the principal points in document CIPM/2008-03, noting that with the reduced dotation approved by the CGPM it would not be possible for the BIPM to fulfil the full programme of work for the period 2009-2012 proposed to the CGPM in 2007.

He reminded the CIPM that over the four-year period there was a shortfall of the budget of nearly 6 million euros as a result of the difference between the requested and approved dotations. He noted that staff costs represented approximately 70 % of the budget, but the bureau of the CIPM had given its agreement early on that the BIPM should try to avoid staff redundancies. On retirement, some staff would be replaced, and others not, depending on the area of the scientific programme, and increasing use would be made of postdoctoral fellowships and secondments from NMIs.

He expressed his thanks to the BIPM's Management Team, who had worked with him on the difficult task of prioritizing the programme. He drew the CIPM's attention to the general criteria that had been applied in the decision making, and noted that the decisions had been taken at the corporate level. The watt balance remained the BIPM's highest priority project.

In addition to a number of internal staff re-allocations and non-replacement of some staff on their retirement, Prof. Wallard was proposing in the document savings of some 3 million euros, as summarized below:

Mass Section:

- Collaborating with the NPL on high-priority activities in the mass programme, eliminating the need for one BIPM post;
- Economies in the purchase of a mass comparator;
- Sharing of a technician between the Mass and Chemistry Sections rather than the recruitment of two members of staff.

Time, Frequency and Gravimetry Section:

- Stopping the iodine cell service, allowing transfer of the staff currently working on this service to higher priority work and to the ozone cross-section measurement project for which a postdoctoral appointment had

been proposed. Some expected income would be lost as a result of the closure of the service but this is outweighed by the staff and running costs;

- Not replacing the hydrogen masers (although the purchase of a caesium frequency standard might be required, in which case it would be financed from the reserves);
- Reducing the number of receivers to be purchased.

Electricity Section:

- Stopping or delaying the proposed project on Josephson junction standards;
- Additional savings on cryostats for electrical metrology.

Ionizing Radiation Section:

- Delaying the SIR alpha extension project;
- Delaying the NaI detector project;
- Making use of additional in-year income in 2008 to make an early start on two ionizing radiation projects due to start in 2009;
- Additional savings on equipment;
- Delaying the planned purchase of calibration sources.

Chemistry Section:

- Cancelling the primary high-accuracy gas reference systems for NO<sub>x</sub> reference systems;
- Reducing the effort on organic primary calibrators and some air-quality/greenhouse gas work.

Support Services:

- Savings in workshop expenditure;
- Savings in the cost of international coordination activities and on staff expenses of the Publications Section;
- Not appointing an accountant in the Finance and Administration Section as proposed in the Programme of Work;
- Savings on general services expenditure;
- Savings on, and delays to, building expenditure.

In addition, he proposed that the BIPM should take advantage of its reserves to fund unexpected expenses, if needed, such as special items of scientific equipment for key activities and some infrastructure activities. Use of the



reserves in this way would, he expected, be up to a limited extent and agreed on an annual basis.

Prof. Wallard recommended the paper for the CIPM's approval. He noted that if the above savings of 3 million euros were agreed by the CIPM, then there still remained a gap between the cost of the reduced work programme and the dotation agreed in 2007 for the four year period. However, he anticipated substantial additional income which would help meet the difference; he expected the additional income to come from at least two new Member States and five additional Associates. He also expected the commitment of voluntary contributions, a substantial number of which had already been confirmed. He believed these levels of additional income to be a conservative estimate.

Prof. Göbel invited the CIPM to discuss the paper. Dr Arias noted that decisions would have to be made on the long-term future of gravimetry at the BIPM, in particular to respond to internal needs, and called for the CIPM to consider carefully this area of work. Prof. Göbel agreed that this would be discussed by the bureau.

Prof. Issaev accepted that it might not be possible for the BIPM to continue developing gravimeters, adding that perhaps the VNIIM would be able to provide gravimeters to the BIPM in the future. However, it was essential that the International Comparison of Absolute Gravimeters (ICAG) be supported in 2009. Prof. Wallard assured him that the commitment to ICAG-2009 would be honoured.

Dr Sacconi agreed that the right procedure was being followed: establishing first the criteria for making the programme choices. He suggested some additional criteria and stressed the need to deliver stakeholder benefits such as calibrations and help in the organization of key comparisons. He noted it was important to listen to the advice of, and requests from, the CCs, particularly that the BIPM should act as the pilot laboratory for comparisons, so reducing the load on NMIs. Prof. Göbel asked the CIPM to concentrate for the time-being on the prioritization presented in the current document, and drew attention to the Conclusions section of the document. On the income, he asked if the problem of arrears had been taken into account. Prof. Wallard noted that this would be discussed later in the agenda (see §17.2). The present document was consistent with the other document presented on accounting procedures.

Mrs Perent clarified that the figures did not take into account non-payment of the compulsory contributions but were based on the assumption that the BIPM would receive 100 % of the voted dotation and 71 % of the additional discretionary contribution. She noted that, if needed, the reserves would be used to cover the fluctuations in payments of the annual contributions from Member States. She reminded the CIPM that if a Member State does not pay its contribution for three consecutive years, then in the fourth year its contribution is distributed among the other Member States (and hence is an advance made by the other Members to the defaulting State).

Dr Schwitz welcomed the analysis, especially the connections made between the programmes and their cost. He supported the conclusions.

Mr Énard commented that the paper was clear and well presented. At the 23rd meeting of the CGPM, the CIPM's proposal for an ambitious programme was not supported financially and the proposal now in front of the CIPM represented an acceptable reduction.

Dr Hengstberger was pleased that the proposals maintained the future high priorities.

Prof. Göbel asked if the CIPM agreed with the proposed programme in bioanalysis. Dr Kaarls commented that the presented paper was coherent with the priorities previously agreed by the CIPM. Dr Sacconi called for room to be left for cross-section activities.

Prof. Ugur accepted the proposals but drew attention to the economic crisis and suggested that a fourth financial scenario consider the case where the Member States did not pay their contributions and inflation increased markedly. Prof. Wallard reminded the CIPM that the BIPM's reserves are largely held in secure, short-term and long-term funds. If the BIPM was faced with a catastrophic financial situation, it would deal with it.

The CIPM approved the presented programme. Prof. Göbel suggested that when the new Deputy Director arrived in 2009, he could work with Prof. Wallard to develop the strategy for drawing up the BIPM's next work programme.

#### **14.2 Proposed action plan related to the “limited outreach activity”**

Prof. Wallard presented a brief summary of document CIPM/2008-40, on the proposed action plan for the BIPM's “limited outreach activity”. The aim was

to alert NMIs of States in development and in transition to the benefit of states becoming a Member State or an Associate of the CGPM. Prof. Göbel asked if the three secondees at the BIPM working on such activities had set job descriptions within the agreed programme. Prof. Wallard confirmed that they had, and added that their targets evolved quickly. The success of the programme would be judged in terms of the number of new Member States and Associates.

The report was accepted without discussion.

#### **14.3 Draft criteria to encourage Associate states to become Member States, and to assess applications from Economies to become Associates**

Prof. Wallard apologized that the relevant document, CIPM/2008-38 "*Promotion of Accession of Associate States as Member States*", had only been made available the previous week. Prof. Göbel asked the CIPM to consider particularly the five criteria presented on the second page of the document, i.e:

- Association for more than 5 years, in accordance with Resolution 5; adopted by the CGPM at its 23rd meeting;
- Signature by NMI of the CIPM MRA;
- participation in comparisons;
- CMCs listed in the KCDB with their related uncertainty;
- Financial situation not precluding Associate to accede.

He asked that comments be sent to Prof. Wallard before the end of 2008 so that he could prepare a new version for discussion by the bureau in March 2009.

Dr Schwitz asked about awareness of these issues. Prof. Wallard replied that, following the last meeting of the CGPM, the Associate States were aware that they would be encouraged to make the transition to Member. Any State could approach the BIPM to become a Member, and the BIPM would make contact with the Associate States identified by the criteria.

Prof. Göbel recognized that it was important to consider the implications that an increase in the number of Member States might have on the BIPM work programme. This would be addressed by the bureau of the CIPM.

Dr Kaarls drew attention to the table presented at the end of CIPM/2008-38, summarizing data on the current Associates. Dr Hengstberger pointed out that the publication of CMCs in the KCDB is a very clear criterion as this causes work for the BIPM, whereas the ability to participate in an RMO key comparison does not imply a financial burden on the BIPM.

Prof. Issaev encouraged the accession of Kazakhstan as a Member State. He wondered if the absence of CMCs would prove an obstacle. Prof. Wallard assured him that this was a separate issue, and Dr Hengstberger agreed that this was a matter of time, as they would need more experience in key comparisons in order to underpin their CMCs.

Dr McLaren expressed concern about the increasing costs of supporting the growing number of Associates. He suggested that perhaps the publication of CMCs in the KCDB could be used as an criterion for changing category, and that an Associate State whose NMI has had CMCs in the KCDB for 5 years would have to become a Member. Prof. Göbel agreed that this issue should be discussed in advance of the next meeting of the CGPM.

Prof. Göbel drew the discussion to a close, reminding the CIPM that they should send their comments to Prof. Wallard before the end of 2008.

## **15 PREPARATION FOR THE 24th MEETING OF THE CGPM**

### **15.1 General approach and interactions with governments before the CGPM**

Prof. Göbel pointed out that Prof. M. Kühne, Director Designate, would be heavily involved in preparing for the next meeting of the CGPM, as he will be responsible for presenting the next work programme. Prof. Göbel commented on the importance of contacting governments well before the meeting of the CGPM. It was noted that within the EURAMET area this could be done at the regular meetings of officials mentioned in §2.12. Mr Érard commented that the first government meeting had been so successful that it was going to be repeated. Dr Bennett added that he had

been invited to attend this next meeting, to be held in den Haag (the Netherlands).

Prof. Göbel asked if the idea could be extended to other regions. Dr May suggested that members of the US State Department and representatives from other States could be invited to the BIPM for a presentation such as that made to the CIPM on Wednesday morning. A number of governments would be swayed by the quality of the scientific work presented.

Dr Hengstberger commented that the presentations would need to be adapted to an appropriate level, and concentrate particularly on impact. He encouraged other interested parties to lobby on the BIPM's behalf.

Dr Inglis suggested that CIPM members making presentations during the year should include success stories from the BIPM. This would provide strong support in favour of the BIPM's work programme, and the success stories would be passed to people who could lobby in turn.

Prof. Ugur pointed out that it was important not only to demonstrate the success of the BIPM, but also to show how the States would benefit if they paid more. He suggested that motivating industries to demand BIPM support would provide powerful arguments to the governments.

Dr Hengstberger recommended that members of the Working Group on the Dotation could be selected a year in advance so that they could be lobbied. Dr Quinn pointed out that the States paying more than 2 % of the dotation formed a fixed core in the Working Group on Dotation, so this group could easily be invited to attend presentations. Mrs Perent commented that indeed this had also been suggested during the last meeting of the CGPM, and should be organized.

Dr Tanaka called for more financial details to be discussed earlier. Dr McLaren agreed, noting that the lobbying must also start far in advance of the meeting of the CGPM. He pointed out that for the USA and Canada, for example, the position on the dotation is fixed more than a year in advance of the meeting of the CGPM. He also believed it was important to treat every State as an individual entity.

Dr Schwitz asked CIPM members to make every effort to understand and provide clear feedback on their governments' positions.

Prof. Wallard added that, as mentioned by Dr Kaarls in §2.12, he intended to produce a short annual newsletter targeted to the community of governments, highlighting the impact of the BIPM's work.

## 15.2 Proposal for a linear accelerator at the BIPM

Dr Allisy-Roberts presented document CIPM/2008-19 on the work of the CCRI Accelerator Dosimetry Working Group (ADWG(I)). She reminded the CIPM that this Working Group had been set up at the request of the CIPM to consider the need for comparisons and calibrations in the field of accelerator dosimetry. In particular the terms of reference of the ADWG(I) included defining the programme of work of the BIPM for the 2013–2016 period on the basis of an accelerator installed at the BIPM, and on the basis of accelerators not based at the BIPM.

Dr Allisy-Roberts presented the initial findings of the Working Group, which had met at the BIPM on 10 April 2008. In the first instance, for the 2009–2012 programme, the BIPM will cooperate with NMIs equipped with accelerators and will run two bilateral comparisons per year using the BIPM primary standard graphite calorimeter at each of the eight NMIs with an accelerator. A trial will take place at the LNE-LNHB in January 2009, and the first full participants will probably be the METAS and NRC-INMS in March and June 2009, respectively.

Dr Allisy-Roberts circulated a leaflet produced by the Working Group, presenting the benefits and costs of having an accelerator facility at the BIPM. This promotional leaflet could be used to support the campaign for funding. A series of proposals to obtain the necessary funding will be presented to the CCRI in May 2009.

Dr Hengstberger asked why the cost should be shared equally by all the Member States. Dr Allisy-Roberts replied that the cost could be distributed in other ways, but pointed out that smaller Member States would benefit more from this facility than would the larger ones, so it may not be appropriate to base the calculation on Gross National Product (GNP). She suggested that the proposal should be put to the next meeting of the CGPM through a separate Resolution with a dedicated extraordinary dotation.

Prof. Göbel asked if scientific foundations could be approached for financial contributions. Dr Hengstberger suggested that the IAEA could also be approached. Dr Allisy-Roberts agreed that all possible sources of funding should be approached, within the constraints of the BIPM financial regulations.

Prof. Göbel asked the CIPM for their views on the importance of the project. Dr Hengstberger expressed his full support for the proposal, recognizing that it was a large investment but would have a high impact.

Dr Inglis agreed that it was important to take a long-term view; he believed a linear accelerator (linac) at the BIPM would prove a useful facility for many years to come. Dr Kaarls agreed. Dr Inglis added that new uses of the accelerator would undoubtedly arise during the lifetime of the facility.

Dr Bennett called for a document proposing the BIPM's work programme with or without a dedicated accelerator at the BIPM, saying this would help the CIPM make the appropriate choice.

Dr Schwitz called for the possibility of an external linac to be explored, and Mr Énard said he could offer the BIPM 10 % of time on an LNE accelerator.

Dr Allisy-Roberts thanked Mr Énard and gratefully accepted his offer. However, she pointed out that for the BIPM to operate an efficient programme, the BIPM would require 100 % of the time of the external accelerator and would need a permanent staff presence. Prof. Wallard agreed that a dedicated facility was needed.

Prof. Göbel commented that even though the PTB has three linacs, he was in favour of the BIPM also having one.

Dr Schwitz later added a note of concern about presenting a dedicated Resolution on the linac facility, saying that if the funding and the project were linked and the Resolution was refused, then it would not be possible to establish a linac at the BIPM even if another source of funding were found.

## **16 WORK OF THE BIPM**

### **16.1 Director's Report for 2007-2008**

The Directors' annual report of the activities of the BIPM had been circulated prior to the meeting. There were no comments, and the report was approved for publication.

## **16.2 Report of the Management Review of Quality System**

Prof. Wallard presented document CIPM/2008-29. The BIPM Quality Manager, Dr Rainer Köhler, has been on extended sick leave for almost a year<sup>3</sup>, and during this period the Director has been acting Quality Manager, assisted by Mr Streak, who has a background in quality system management.

Internal audits are carried out annually in each technical area. External peer-review audits take place on a three-year cycle, and a number of these external assessments will take place over the next two years. An external assessment of the BIPM Quality System was carried out at the beginning of September 2008 by Dr A. Narizano from LATU, Uruguay. A number of positive suggestions arose from this assessment and a plan of action based on the recommendations will be adopted for the coming year. A number of the recommendations related to updating the quality manual to better reflect the practices already in place at the BIPM. It was also suggested that the management team activities be formalized, and that the corrective action system be made more formal.

A management review meeting was held on 16 September 2008, with the participation of Dr Kaarls, CIPM Secretary. The meeting included feedback from all sections and a first review of the suggestions made in the Narizano report.

Prof. Wallard added that in an effort to promote further confidence in the BIPM, the BIPM Quality System would soon be presented to experts drawn from the RMOs.

Dr Kaarls commented that the external review had been good and very useful. There were no other comments from the CIPM.

## **16.3 Health and safety**

Prof. Wallard presented a brief report on the health and safety arrangements at the BIPM, noting that full details were provided in document CIPM/2008-16. A new Health and Safety Committee has been put in place, comprising a designated Health and Safety Manager, four members trained in the BIPM's key technical areas related to safety (lasers, electricity, ionizing radiation, and

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<sup>3</sup> Dr Rainer Köhler, who was on long-term sick leave at the time of the CIPM meeting, passed away on 25 October 2008. On behalf of all of the BIPM staff, the Director expresses his sincere condolences to Dr Köhler's family.



chemistry), the Head of Finance and Administration, the Head of the Workshop, and two members of the staff commissions. An external review of health and safety procedures was carried out in April 2008. The CIPM noted the report and there were no questions.

#### **16.4 BIPM calibration and measurement services**

Prof. Wallard drew attention to document CIPM/2008-31, prepared by Dr Davis, on the proposed presentation of the BIPM data related to its calibration and measurement services. The proposal is to present the BIPM calibration and measurement services on the BIPM website in two steps. The first stage will be to list the BIPM's calibration services on the BIPM website and provide a link to them from the KCDB Appendix C. Prof. Wallard noted that document CIPM/2008-31 concerned this first step, with the aim of providing a transparent traceability chain for accreditors. In a second step, still under discussion, lists of measurement services would also be added.

Prof. Göbel expressed his view that the report proposed a sensible way of proceeding. There were no other comments and the paper was approved. Prof. Göbel expressed his thanks to Dr Davis and the other BIPM staff involved.

#### **16.5 BIPM Summer School 2008**

Dr Thomas, Scientific Secretary of the BIPM Metrology Summer School 2008, presented document CIPM/2008-18, reporting on the success of the School which was held at the BIPM from 29 June to 11 July 2008. The School was co-directed by Prof. Wallard, Dr A. Steele (NRC, Canada) and Dr M. Sargent (LGC, UK), and involved a total of 42 teachers for lectures and workshop activities. Special talks were also given by three Nobel laureates: Prof. Sir Harry Kroto, Prof. William Phillips, and Prof. Klaus von Klitzing; as well as by Mrs Dava Sobel, scientific journalist. The School was attended by 90 students and included a mixture of theory and experiment, chemistry and physics, and views of both the current and possible future versions of the SI. Dr Thomas reported that it had been a very successful event, with positive feedback from the students and a sense that its primary purpose, of creating interactions and friendships between the metrologists of the future, had been achieved.

Dr Thomas said that the efficiency of the Summer School reflected well on the support services of the BIPM, and expressed her thanks to all involved. On behalf of the CIPM, Prof. Göbel thanked Dr Thomas for her upbeat report and hard work, and congratulated all involved.

## **17 ADMINISTRATIVE AND FINANCIAL AFFAIRS**

### **17.1 *Rapport aux Gouvernements, audit report***

Mrs Perent noted that the *Rapport aux Gouvernements des hautes parties contractantes sur la situation administrative et financière du Bureau International des Poids et Mesures* for 2007 had been circulated to the CIPM and a paper copy of the auditors' report had been distributed at the start of the CIPM meeting. There was nothing particular to report and the CIPM gave the required formal discharge to the Director and Administrator of the BIPM.

Mrs Perent thanked the CIPM for its support, and noted that the accounting resources of the BIPM were small but effective.

### **17.2 Member States in arrears**

Mrs Perent reported that the contributions in arrears for 3 years or less (and thus owed directly to the BIPM) amounted to 1 847 922 euros as at 10 October 2008. This sum related to unpaid contributions from: Argentina, Ireland, Italy, the Republic of Korea, Pakistan, Slovakia, South Africa, Sweden, the USA, and Uruguay, and concerned mostly contributions for 2008. Mrs Perent had heard that Argentina would be paying soon, but pointed out that the missing American contribution was of concern. The USA had only paid 22 % of their contribution for 2008.

Contributions in arrears for more than 3 years, and therefore distributed among the other Member States, amounted to a total of 3.4 million euros from Cameroon, the Dominican Republic, the Islamic Republic of Iran, and the Democratic People's Republic of Korea. Mrs Perent summarized the current status of discussions with each of these States.

- In brief, discussions are ongoing with the Islamic Republic of Iran, who indicated in 2005 that they wished to put an end to their suspension but without paying the full financial arrears since 1979. The BIPM held a meeting at its headquarters with the Iranian authorities and sent a *Note Verbale* in March 2008 providing a detailed answer to their arguments with a clear procedure for their request based on Resolution 8 voted by the CGPM at its 23rd meeting. No reply to the *Note Verbale* has yet been received, but the BIPM has maintained regular contacts with the Iranian embassy in Paris and has learned that a meeting was convened with the Director of the Iranian NMI and the Presidency council in Tehran to discuss the matter.
- The BIPM Administrator has held a meeting with a representative in France of the Democratic People's Republic of Korea (DPR Korea). Information on the activities of the BIPM, on the financial arrears of the DPR Korea and on the provisions adopted in Resolution 8 by the CGPM in November 2007 were detailed, in particular the possibility that there could be agreement on a rescheduling arrangement. However, the representative of the DPR Korea doubted that the arrears could be settled and asked whether it would be possible to cancel the debts as was done, according to him, in other international organizations. A *Note Verbale* outlining the benefits of participating anew and informing the government of the DPR Korea on the provisions on financial arrears adopted last November 2007 by the Member States has been sent but as yet no reply has been received.
- The BIPM Administrator had an appointment in June 2008 with Commercial and Economic Affairs Counsellor of the embassy of the Dominican Republic in Paris during which information on the activities of the BIPM and the provisions adopted in Resolution 8 by the CGPM in November 2007, in particular the possibility to agree on a rescheduling agreement, were fully detailed. A *Note Verbale* was then sent to the embassy as a confirmation. No reply to the BIPM *Note Verbale* has been received. Recently, during the meeting of the SIM General Assembly, the Director of the BIPM and the Secretary of the CIPM met with the Director of the national metrology institute of the Dominican Republic. Appointments have been made to initiate discussions, involving also the embassy of the Dominican Republic in Paris to find a solution for the payment of the arrears and the renewed participation of the Dominican Republic in the activities of the BIPM.

- The BIPM still needs to contact the embassy of Cameroon to alert them to the consequences of the application of Resolution 8 voted by the CGPM at its 23rd meeting and try to make progress on the issue of their arrears.

Mrs Perent then reported that eleven of the Associate States had not settled their subscriptions for 2008, representing financial arrears of a total of 76 900 euros. The Associates concerned were: Costa Rica, Cuba, Ecuador, Jamaica, Kazakhstan, Kenya, Latvia, the former Yugoslav Republic of Macedonia, Sri Lanka, Slovenia and Tunisia. Reminders had been sent and would soon be renewed.

Prof. Göbel thanked Mrs Perent for her report and invited questions.

Prof. Ugur asked how it was possible that Kazakhstan had unpaid subscriptions as an Associate, when it had already sent money towards becoming a Member State. Mrs Perent explained that Kazakhstan had not yet settled its subscription as Associate of the CGPM for 2008 and had indeed made a partial payment of its future contribution for future Membership, although this had been done before all the necessary formalities for Kazakhstan to become a Member State of the BIPM had been completed.

Dr Inglis asked what the provision was for Associates with arrears. Mrs Perent confirmed that Resolution 3 voted by the CGPM at its 21st meeting stipulated that an Associate State or Economy three years in arrears with its subscription would lose its Associate status.

### **17.3 Report on the situation of Peru**

The Director invited Mr Cèbe to report on the request from Peru to become an Associate of the CGPM.

Mr Cèbe informed the CIPM that in April 2008 the BIPM received from the embassy of Peru in Paris a request for details on the accession procedure for Peru. He reminded the CIPM that Peru was one of the original signatories of the Metre Convention. In 1956 the Government of Peru sent a note to the French Embassy in Lima saying they wished to withdraw. Even if the French authorities may consider that the correct procedure was not followed, the Member States considered from 1960 that Peru was no longer a Member State.

The CIPM fully reviewed and discussed the issue of the accession of Peru as a Member or as an Associate State. The CIPM concurred with Mr Cèbe's

advice that, since laws and resolutions have no retroactive effect unless they state otherwise, and as Resolution 5 adopted by the CGPM at its 23rd meeting does not state that it has a retroactive effect, it only applies to the States that were Members of the BIPM at the time of adoption of the Resolution, or which cease to be Member States after the adoption of the Resolution 5, could not in the future apply to become Associates. The CIPM decided that Peru, which was not a Member at the time of adoption of the Resolution, could apply to become a Member or an Associate State as it so wished.

Dr Valdés favoured this approach, noting that it was supported by clear legal arguments. It was noted that it was in the interest of Peru to become a Member State, but if Peru officially requested to become an Associate State, then this was possible. Dr Schwitz pointed out that Associateship should be considered a step on the route to Membership.

Prof. Ugur suggested that Peru could become a Member State straightaway or could wait until the next meeting of the CGPM to be approved as an Associate. Mrs Perent pointed out that each State is free to choose to become a Member State or an Associate, and both processes of accession are automatic processes. The BIPM always provides information on both options when contacted by a State.

Prof. Göbel remarked that the Peruvian metrology institute had confirmed that Peru could not pay the Member State contribution. Dr Hengstberger thought it would be useful to remind Peru that it could move subsequently from Associateship to Membership.

Mr Cèbe commented that the CIPM decision will be communicated to the Peruvian Embassy by *Note Verbale* and will of course to the CGPM at its next meeting.

#### **17.4 On the additional discretionary contribution**

Prof. Wallard introduced the brief document CIPM/2008-04, reminding members that Resolution 3 voted by the CGPM at its 23rd meeting (2007) included an additional discretionary contribution to support the programme of work of the BIPM. He reported that positive responses to payment of the discretionary contribution had been received from: Australia, Austria, Belgium, India, Republic of Korea, Portugal, Thailand, and the UK. In addition, Canada, China, Germany, the Netherlands, and Switzerland have

indicated that they would pay. Negative responses have been received from: the Czech Republic, Hungary, Malaysia, Spain, and the USA. Considering the four Member States having arrears for more than three years – Cameroon, the Dominican Republic, Islamic Republic of Iran and the Democratic People's Republic of Korea – and the three States – Chile, Turkey, Mexico – that did not commit to paying the additional discretionary contribution over the period 2005–2008, the BIPM's working assumption is that a total of only 71 % of the additional discretionary contribution will be paid.

In addition, five NMIs have confirmed that they will provide a voluntary contribution as follows:

- The PTB (Germany) will provide an annual grant of 24 000 euros for the living allowance for the JCRB Executive Secretary post in 2008 and 2009;
- The NMIA (Australia) will provide 7 000 euros per year over the four-year period;
- The NIST (USA) has confirmed the extension of Dr Espina's secondment until March 2010 and hoped to provide support for the watt balance project although there is as yet no detailed agreement on this contribution (a secondment is being discussed). It seems likely that there may also be support for the BIPM Chemistry programme;
- The LATU (Uruguay) and the NMISA (South Africa) have agreed to second Prof. Mussio and Mr Streak, respectively, until March 2010;
- The NPL (UK) has offered to provide one man-year during the four-year period in support of the mass programme;
- The MKEH (Hungary) is prepared to participate in BIPM projects through guest research workers.

Mrs Perent reported that France had orally mentioned that they would not pay the additional discretionary contribution.

Prof. Issaev said he would check the situation concerning the Russian Federation, which he believed had sent a letter promising to pay.<sup>4</sup>

Dr May confirmed that the NIST expected to support the Chemistry Section's programme through a financial contribution.

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<sup>4</sup> It was subsequently confirmed that the Russian Federation will indeed pay the additional discretionary contribution.

Dr Tanaka indicated that the NMIJ would provide financial support and speakers for the symposium to celebrate the ten-year anniversary of the CIPM MRA.

#### **17.5 On the budget for 2008**

Prof. Wallard presented the estimated outturn budget for 2008 (CIPM/2008-44), noting the assumption that the BIPM would receive 92 % of the contributions due from Member States for 2008, and 80 % of the subscription fees due from Associates.

He noted that a significant fraction of the miscellaneous income represented the registration fees for the BIPM Metrology Summer School. Income from *Metrologia* was a little lower than initially estimated, due to a decrease in the sales of the archives. Publications have cost less than expected mainly because publication of the proceedings from the last meeting of the CGPM has slipped into 2009. The library has also cost a little less than predicted, reflecting the move to more electronic journals which are less expensive.

On the level of spending under the heading “staff expenses” estimated below the budget, Prof. Wallard pointed out that the appointment of the new Deputy Director and Director Designate, initially budgeted for June 2008, would now take effect from April 2009. In addition, two probationary periods had been terminated and new appointments to fill these vacancies were in progress. One Head of Section (Dr Williams) would be leaving in November 2008. One secretary would not be replaced after her departure as a result of savings which were needed to balance the budget of the 2009–2012 programme of work. A significant part of the salaries of two staff members on long-term sick-leave was supported by the health insurance.

He pointed out that the difference in laboratory expenditure was caused by delaying until 2009 the purchase of a cryostat for the watt balance and satellite receivers for the Galileo project. The major item of expenditure under “site maintenance” in 2008 had been the refurbishment of the electricity laboratories. The underestimate of the “miscellaneous” line was caused by the purchase of platinum-iridium for the production of prototypes to supply orders received in 2008 and to be delivered in 2009.

He concluded a transfer from reserves was planned, largely to cover the unpaid contribution of the USA. If more funds were received, the amount of

the transfer would be adjusted accordingly. He reminded the CIPM that the majority of the BIPM's portfolio was held in secure funds.

Dr Schwitz asked about the type of laboratory expenditure, which Mrs Perent explained averaged at about 30 % running costs and 70 % investment, a percentage that varies from year to year.

The outturn of the 2008 budget was noted.

#### **17.6 On the draft budget for 2009**

Prof. Wallard presented the draft budget for 2009 (CIPM/2008-45). He noted that the first line of income was based on the assumption that 71 % of the additional discretionary contribution would be paid, and that all the Member States' contributions would be received. The "miscellaneous income" included voluntary contributions from the PTB and the NMIA, sales of Pt-Ir prototypes, sales of iodine cells, support for the JCTLM secretariat, and registration fees for meetings.

He noted that 2009 would see the appointments of the Deputy Director and Director Designate, a physicist for the watt balance project, a technician for mass/chemistry, a technician for organic chemistry, and a fixed-term physicist for the Mass Section under a fixed-term appointment. Dr L. Vitushkin (Principal Research Physicist) would be retiring, Dr E. de Mirandés (Research Fellow) would be finishing her two-year fellowship, and two new secondees were expected.

He reminded the CIPM that the BIPM welcomed secondments from NMI staff, and that expatriate staff benefited from an installation allowance.

The cost of publications in 2009 would include publication of the delayed proceedings of the 23rd meeting of the CGPM (2007) and would reflect a new arrangement of the section structure, following Dr Williams' departure in November 2008.

The cost of meetings will be high as there is a heavy load of meetings during 2009, including meetings of eight Consultative Committees and many Working Groups, three meetings of the bureau of the CIPM, the NMI Directors' meeting and the Symposium for the ten-year anniversary of the CIPM MRA, and of course the meeting of the CIPM itself.

The CIPM's attention was drawn to the proposal that, for the first time, a registration fee would be charged for the 2009 Directors' meeting, during



which a preliminary draft of the BIPM's programme of work for 2013–2016 would be presented. There would also be a registration fee for the Symposium organized to mark the ten years of the CIPM MRA. The CIPM agreed that it was appropriate to charge a registration fee for these meetings, which will be held back-to-back during October 2009.

Line 6 of the "Operating Expenses" includes travel costs for the dosimetry comparisons using external linac facilities.

Prof. Wallard noted that the budget includes the cost of the production of new artefacts for the kilogram, including in platinum, stainless steel, and possibly in gold. If it was necessary to make a transfer from the reserves to fund the latter, he would discuss this with the bureau.

Finally he pointed out that new arrangements were being made for the BIPM reception area. The reception had previously been situated in the Nouveau Pavillon but it had been decided that it would be more appropriate for it to be housed in the building to the left of the main entrance to the BIPM. Some further fitting-out of the new reception area was required.

Prof. Wallard invited questions on the draft budget.

Prof. Issaev queried the line of zeros included in the Secretary's financial report (§2.19) under the headline "special fund for the improvement of scientific equipment". Mrs Perent pointed out that this line referred to a special fund maintained through the entry contributions of new Member States according to the Metre Convention, and since there have been no new Members recently, the fund was empty. There was general agreement from the CIPM that the line as presented was misleading, but Prof. Wallard delayed further discussion to the discussion on the accounting rules.

Dr Bennett noted that the forecasted increase in energy costs for 2009 was not too high, and asked if the BIPM had taken particular steps to reduce energy costs. Prof. Wallard confirmed that indeed the BIPM was taking a number of steps to reduce costs. He noted that the heating system in the Observatory would soon need to be replaced and a more complete study would be made at that time.

Dr Bennett asked what was the estimated level of inflation for France in 2009, noting that for the UK it was estimated at over 5 %. Mrs Perent replied that the level of inflation was expected to rise to 3 % in France but this increase could be limited as there were threats of recession resulting from

the economic crisis. As a result, in the budget presented for 2009 a level of 2.5 % had been assumed.

Dr Quinn highlighted the need for maintenance of the buildings. He noted it was essential to maintain the air-conditioning system and Mrs Perent confirmed that current requirements were tighter than ever before. She added that older air-conditioning systems lasted longer and recently there had been unforeseen expenses related to air-conditioning. The consequences on the scientific programme of a failure in the air-conditioning system were significant and a policy was being put into place.

Dr Valdés asked what were the travelling and living allowances of the JCDCMAS Executive Secretary. Mrs Perent replied that his expenses were estimated at 44 000 euros for 2009.

Prof. Wallard added that the BIPM offered approximately 3000 euros per month for all secondees, and added that in the future he hoped that UNIDO would support a part of the BIPM's activities in support of metrology in developing countries.

Prof. Ugur noted that 2006 and 2007 were the best years in terms of economic boom, whereas the next meeting of the CGPM would probably fall during the recession. He was not optimistic about the next four-year dotation to be voted by the CGPM at its 24th meeting, and called for a special meeting of the CIPM, to which he would like to contribute, to be held in 2009 to look at possible options for funding.

Mrs Perent recalled that payment of contributions was an obligation of Member States, and that the BIPM also welcomed voluntary contributions from the Member States and NMIs as well as from other international organizations, private organizations and foundations; this was highlighted in the text of Resolution 3 approved by the CGPM at its 23rd meeting.

The draft budget for 2009 was formally approved.

## Budget for 2009

**Income**

euros

*Budgetary income:*

1. Contributions from the States	10 828 971
2. Interest on capital	306 400
3. Miscellaneous income	278 400
4. Subscriptions from the Associates	225 556
5. <i>Metrologia</i>	93 000
6. Transfer from Account I. — Ordinary funds	570 073
<b>Total</b>	<b>12 302 400</b>

**Expenditure***A. Staff expenses:*

1. Salaries	4 821 000	} 6 513 100
2. Family and social allowances	1 222 800	
3. Social expenses	469 100	

<i>B. Contribution to the pension fund:</i>	2 218 000
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*C. Operating expenses:*

1. Heating, water, electrical energy	220 400	} 1 296 300
2. Insurance	40 900	
3. Publications	105 300	
4. Office expenses	148 200	
5. Meeting expenses	196 700	
6. Travel expenses and freight charges	386 800	
7. Library	165 000	
8. Bureau of the CIPM	33 000	

<i>D. Laboratories:</i>	1 769 000
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<i>E. Buildings (major maintenance and renovation):</i>	433 600
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<i>F. Miscellaneous and unforeseen expenses:</i>	72 400
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<b>Total</b>	<b>12 302 400</b>
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**17.7 Staffing changes**

Prof. Wallard presented document CIPM/2008-35 summarizing the staffing changes since November 2007.

He noted that there would be a restructuring of the IT and Publications Sections. Dr Williams, Head of Publications, would leave the BIPM at the end of November 2008, and he would continue his services as Editor of *Metrologia* under a consultant contract.

He noted that there had been three long-term and five shorter-term secondments at the BIPM during 2008 and he expected the number of secondees to rise to nine in 2009.

In relation to a number of discussions on gravimetry during the CIPM meeting this week, Prof. Wallard drew attention to document CIPM/2008-42 proposing that the CIPM authorize Dr Vitushkin to remain in service beyond the age limit of servicing staff of 65. This would enable the BIPM to fulfil its mission in relation to the next ICAG. The proposal as outlined in CIPM/2008-42 was approved unanimously.

Dr Hengstberger asked if the necessary expertise in gravimetry would remain in-house for the watt balance measurements. Prof. Wallard confirmed that the expertise exists but noted that the development of new gravimeters would not be pursued; he confirmed that the BIPM's upgraded gravimeter was expected to be sufficient for the watt balance experiment. Dr Hengstberger pointed out that the  $g$  measurement was one of the limiting factors in the watt balance experiment, and commented that the results of recent ICAGs had shown unexplained shifts of up to 10  $\mu\text{Gal}$ .

#### **17.8 Implementation of the Regulations, Rules and Instructions applicable to staff members**

Mrs Perent reported that the new Staff Regulations, Rules and Instructions applicable to staff members (SRI) had entered into force on 2 May 2008 after their approval by the CIPM by correspondence on 12 February 2008. They had been presented to the BIPM staff by the legal adviser and fully discussed at meetings in both French and English. During these meetings, the Director, the Head of Finance and Administration and the legal adviser answered questions from the staff and the Director responded subsequently, and in writing, to a number of other points made by staff. The SRI were published on the intranet and communicated to all staff members in both paper and electronic forms. Since their implementation a number of actions have been put into place. The new staff Commission for Conditions of Employment has been created, and members of the Appeals Board were elected by the staff and also nominated by the Director. A new contractual arrangement for the

provision of travel services has been put into place and will be fully operational from November 2008. There remain various points to put into place, including the editing of appraisal forms.

Mrs Perent expressed her thanks to Mr Cèbe for his work on this. She informed the CIPM that two proposals for amendments would shortly be circulated to the CIPM for approval by correspondence. The first one is aimed at amending the rule 6.1.2 about the Applications Review Board in order to address the composition of the Board in two specific situations: when the post to be filled is that of a Head of Section, and when the post to be filled includes functions of supervision. The second proposal is aimed at creating an arrangement for “therapeutic part-time” working, aimed at encouraging staff members on long-term sick-leave to resume work, even on a part-time basis. Mr Érard asked whether these amendments came from the staff or the management. Mrs Perent confirmed that they came from the management.

Prof. Göbel thanked Mrs Perent and Mr Cèbe for their work on the staff rules. There were no other questions from the CIPM.

## **17.9 On the salary review and pension fund**

Mrs Perent reported that a salary survey had been conducted for the BIPM by the Inter-Organisations Study Section on Salaries and Prices (IOS) of the Co-ordinated Organisations, with the aim of comparing the BIPM remuneration packages including all current allowances with those paid in various employment markets. The study compared the BIPM remuneration packages with those paid by other international organizations, by some national metrology institutes and by the private sector with reference to France, the BIPM’s host state. It considered recruitment salaries, i.e. start-of-career salaries as they are pertinent to recruitment, and end-of-career salaries as they give a broad indication on how pay may contribute to retaining and motivating staff, and considered two staff profiles and a range of different posts.

Mrs Perent presented a summary of the preliminary findings of the study, and added that they would be reviewed with the results of the actuarial study of the BIPM Pension Scheme; the latter will include the financial consequences of any recommended modifications to the BIPM Pension Scheme. She pointed out that the BIPM has to provide an attractive salary and benefits package to staff and that the pension scheme forms an important part of this

remuneration package. An external review of the BIPM Pension Scheme has been carried out, so as to compare the BIPM regulations of the BIPM Pension Scheme with those of other international organizations, to review the recent evolutions of schemes in other international organizations, in terms of benefits as well as in terms of contributions, and to make recommendations with the aim of clarifying and completing the regulations of the BIPM Pension Scheme.

Although the general assessment of the existing Pension Scheme of the BIPM is very positive, the report presents recommendations where changes seem possible and why. Some of the reforms proposed would have significant effects on the long-term costs of the scheme. It is expected that recommendations on the BIPM remuneration packages and on the BIPM Pension Scheme will be presented to the CIPM in 2009.

Prof. Göbel thanked Mrs Perent for the excellent summary, and noted that the findings would be presented to the CIPM for discussion in 2009. There were no immediate questions.

#### **17.10 Financial management system and BIPM reserves**

Mrs Perent presented a document laying out the current rules for the use of the BIPM Reserve Fund, and outlined the proposals for use of the BIPM reserves in 2008 and 2009 in the light of the draft budget for 2009. She reminded the CIPM that the Reserve Fund had been constituted uniquely through excess of income over expenditure. Since the creation of the Reserve Fund in 1901, the CIPM decided to use the reserves as follows: (a) mainly to cover the fluctuations in payments of the annual contributions from Member States; (b) to provide resources, as necessary, for the BIPM's scientific programme decided by Member States; (c) to provide resources for building projects; and (d) to make transfers to the Pension Fund.

This is a well-established policy and it was proposed to continue to use the reserves to cover the fluctuations in payments of annual contributions from Member States and other unexpected expenses and to provide resources, as needs occur, for the BIPM's scientific programme decided by Member States. Although unexpected expenses cannot, by definition, be quantified, there are some cases that could be considered for using the reserves to ensure the sound financial management of the BIPM such as:

- coping with the increase in the rate of inflation above the rate of inflation considered at the time of the adoption of the dotation by Member States;

- the cost of scientific equipment if new high-priority projects are necessary within a programme of work or for additional scientific equipment that was not identified at the time of drafting the programme of work;
- carrying out large and urgent building maintenance such as the repair of the roof of the Grand Pavillon or the replacement of air-conditioning systems, if needed as a result of unforeseen circumstances;
- investing in infrastructure such as the IT network.

Mrs Perent informed the CIPM that there is a need to update the Financial Regulations to increase the effectiveness and efficiency of the financial management and to reinforce accountability and transparency. A draft amended Financial Regulations, including a change of the accounting principles and a policy on management of the reserves, will be presented to the CIPM for discussion and approval in 2009.

Prof. Göbel agreed that it was necessary to maintain a significant level of reserves. However, they are currently well over the level of 40 % of the annual budget that some Member States considered as prudent for the BIPM to maintain and this leads to problems when discussing financial matters with Member States. He thought it would be better to split the funds into “reserves” and other funds, such as for scientific equipment.

Dr Kaarls agreed that it was important to increase the transparency of the accounting system. Prof. Wallard added that the changing of the present cash accounting system to the proposed accrual accounting system would help financial planning for the long-term.

Dr Schwitz asked if the assets were known. Prof. Wallard confirmed that they had been estimated in the past, but agreed that a new study was required. Dr Schwitz pointed out that presenting a table with expenditure for the different activities might facilitate discussions on setting priorities. Prof. Wallard noted that the level of disaggregation of the budget had yet to be fixed. Dr Schwitz noted that the fraction of staff time spent on different projects remained the main concern.

Although this would be useful also for the BIPM, and might facilitate communication of the financial situation, it represented a big evolution and huge amount of work for the BIPM. Mr Cèbe commented that the BIPM had very few staff to take this on and, as a legal adviser, he recommended that the BIPM’s accounting system be kept as simple as possible. Prof. Göbel agreed that it was a very time-consuming activity. He cautioned that in 2009 the

CIPM would discuss the matter, but a move to the new system would not be made before 2010.

Prof. Göbel noted that software existed to calculate cost/benefits, but voiced his confidence in Mrs Perent and her team to manage this work. Dr Inglis commented that it was essential to keep in mind the return on investment when considering such changes.

Dr Sacconi called for the administrative reports to be circulated and for the PowerPoint presentations made during the CIPM Workshop to be included on the restricted-access area of the CIPM website. Prof. Wallard agreed that this would be done and invited all CIPM members to pass their presentations to Mrs Joly.

#### **17.11 Mandate and mission of the CIPM**

Prof. Göbel invited Mr Cèbe to comment on the role of the CIPM as presented in document CIPM/2008-36. Mr Cèbe explained that this was not a legal note, but a document presented as an aid for CIPM members – particularly new ones – as well as for BIPM staff. Prof. Göbel welcomed it, commenting that it was clearly structured and he considered it a big help. Dr Inglis agreed that it was very useful to collect all the rules together, and thanked Mr Cèbe for his work. Mr Cèbe noted that it was just an extension of a similar document produced by Dr Quinn some years ago. Prof. Göbel encouraged all members to refer to the new version, noting in particular that it used the current terminology.

Prof. Ugur asked if such a document could also be produced for the CCs. Mr Cèbe replied that this had not yet been done but could be; however, he would not like to make the system too complicated. He was in discussion with Dr Wielgosz on this matter. He also planned to produce a similar document on the CGPM.

Dr Schwitz suggested that a note should also be drawn up on the operation of the bureau of the CIPM. Prof. Göbel agreed that this would be very useful.

Prof. Issaev and Dr Tanaka also welcomed the document, commenting that it was very clear. Dr Tanaka noted that it was important to be able to explain the role of the CIPM, both within the CIPM and to others outside.



## 18 OTHER BUSINESS

Prof. Wallard drew attention to a document he had drafted and that had been distributed that morning (17 October 2008) on the outcome of the CIPM/BIPM workshop. He invited the CIPM members to send their comments to him before the end of October 2008.

He then presented a brief summary of document CIPM/2008-37 on the Workshop on Technical Cooperation being organized for 18-19 March 2009. Prof. Göbel expressed his support for the proposed agenda, saying the important point to discuss was the mandate that any working group would have, if created following the workshop. He noted that the current meeting was for information exchange.

Prof. Issaev drew attention to a new law on metrology that would come into force in the Russian Federation at the end of 2008, to replace the previous law which had been in place for about 15 years. The new law incorporates ideas such as traceability, and explicitly states that requirements for the units which express the values of quantities are established by the CGPM. It includes a new clause that the government is obliged to contribute to international organizations and pay for international comparisons of primary standards. It also states that calibration can be used for verification. Approximately 40 documents will need to be adopted so that the law can be fulfilled. The timescale allowed for this is two years, and a rigid schedule has been drawn up for the presentation of these documents. He said that an English version of the Russian law would be sent to the BIPM and could be posted on the CIPM site. He had not yet allowed publication of the Russian law, pending final checking of the terminology.

Prof. Göbel welcomed the news.

Dr Hengstberger noted that he often received requests from States to see the metrology laws in place in other States. He welcomed examples and publication on open websites.

Dr Tanaka turned the discussion to the understanding of uncertainties claimed for measuring instruments. He asked the CIPM to encourage the CCs to establish agreed uncertainties for widely used measuring instruments, pointing out that this would facilitate the review of a number of CMCs.

Dr Schwitz thought that instrument manufacturers might be reluctant to publicize the information but agreed that it would be useful. Dr Tanaka pointed out that the uncertainty estimates related to the instruments were included within the CMCs declared by the NMIs. When the METAS accepts the CMCs of the NMIIJ, for example, they are effectively accepting the Japanese estimate for the uncertainties of their measuring instruments.

Prof. Göbel agreed that this was an important point and strongly supported the request that the CCs discuss the uncertainties of typical measuring instruments – such as unstabilized lasers, etc. He suggested that the matter be brought back to the CIPM for discussion in 2009, and asked the CC Presidents to note this request.

Prof. Ugur noted that EUROMET (renamed EURAMET) had put such a system in place in the past, and Dr Kaarls remarked that the proposal did not affect the field of chemistry.

## **19      DATE OF NEXT MEETING**

Prof. Göbel reminded the CIPM that the next meeting would be held on 12-16 October 2009. He thanked all participants for coming and for their contributions, and closed the meeting at 12:30.

## LIST OF ACRONYMS AND INITIALISMS USED IN THE PRESENT VOLUME

A*STAR	Agency for Science, Technology and Research (Singapore)
ADWG(I)	CCRI(I) Accelerator Dosimetry Working Group
AFRIMETS	Inter-Africa Metrology System
APMP	Asia Pacific Metrology Programme
BEV	Bundesamt für Eich- und Vermessungswesen, Vienna (Austria)
BIML	International Bureau of Legal Metrology/ <i>Bureau International de Métrologie Légale</i>
BIPM	International Bureau of Weights and Measures/ <i>Bureau International des Poids et Mesures</i>
CC	Consultative Committee of the CIPM
CCAUV	Consultative Committee for Acoustics, Ultrasound and Vibration/ <i>Comité Consultatif de l'Acoustique, des Ultrasons et des Vibrations</i>
CCEM	Consultative Committee for Electricity and Magnetism/ <i>Comité Consultatif d'Électricité et Magnétisme</i>
CCL	Consultative Committee for Length/ <i>Comité Consultatif des Longueurs</i>
CCM	Consultative Committee for Mass and Related Quantities/ <i>Comité Consultatif pour la Masse et les Grandeurs Apparentées</i>
CCPR	Consultative Committee for Photometry and Radiometry/ <i>Comité Consultatif de Photométrie et Radiométrie</i>
CCQM	Consultative Committee for Amount of Substance: Metrology in Chemistry/ <i>Comité Consultatif pour la Quantité de Matière : Métrologie en Chimie</i>
CCRI	Consultative Committee for Ionizing Radiation/ <i>Comité Consultatif des Rayonnements Ionisants</i>
CCRI(I)	CCRI Section I: x- and gamma rays, charged particles
CCRI(II)	CCRI Section II: Measurement of radionuclides
CCRI(III)	CCRI Section III: Neutron measurements
CCT	Consultative Committee for Thermometry/ <i>Comité Consultatif de Thermométrie</i>

CCTF	Consultative Committee for Time and Frequency/ <i>Comité Consultatif du Temps et des Fréquences</i>
CCU	Consultative Committee for Units/ <i>Comité Consultatif des Unités</i>
CEM	Centro Español de Metrología, Madrid (Spain)
CENAM	Centro Nacional de Metrología, Querétaro (Mexico)
CFM	Collège Français de Métrologie
CGPM	General Conference on Weights and Measures/ <i>Conférence Générale des Poids et Mesures</i>
CIML	International Committee of Legal Metrology/ <i>Comité International de Métrologie Legale</i>
CIPM	International Committee for Weights and Measures/ <i>Comité International des Poids et Mesures</i>
CIPM MRA	CIPM Mutual Recognition Arrangement
CITAC	Cooperation on International Traceability in Analytical Chemistry, Trappes (France)
CMC	Calibration and Measurement Capability
CNEA	Comisión Nacional de Energía Atómica, Buenos Aires (Argentina)
Codex Alimentarius:	Commission under the Joint FAO/WHO Food Standards Programme
COOMET	Cooperation in Metrology among the Central European Countries
CPEM	Conference on Precision Electromagnetic Measurements
DFM	Danish Fundamental Metrology Ltd., Lyngby (Denmark)
DIGENOR	Dirección General de Normas y Sistemas de Calidad, Santo Domingo (Dominican Republic)
EFTF	European Frequency and Time Forum
EMPA	Swiss Federal Laboratories for Materials Testing and Research, St Gall (Switzerland)
EURAMET	(the former EUROMET) European Association of National Metrology Institutes
FAO	Food and Agriculture Organization of the United Nations
GAW	WMO Global Atmospheric Watch
GUM	Guide to the Expression of Uncertainty in Measurement
IAC	International Avogadro Coordination
IAEA	International Atomic Energy Agency
ICAG	International Comparison of Absolute Gravimeters
IEC	International Electrotechnical Commission

IFCC	International Federation of Clinical Chemistry and Laboratory Medicine
ILAC	International Laboratory Accreditation Cooperation
ILO	International Labour Organization
IMR	Institute of Mineral Resources, Beijing (P.R. China)
INDECOPI	Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual, San Borja (Peru)
INM	National Institute of Metrology, Bucharest (Romania)
INMETRO	Instituto Nacional de Metrologia, Normalização e Qualidade Industrial, Rio de Janeiro (Brazil)
INPL	National Physical Laboratory of Israel, Jerusalem (Israel)
INRIM	Istituto Nazionale di Ricerca Metrologica, Turin (Italy)
IOPP	Institute of Physics Publishing, Bristol (UK)
IRMM	Institute for Reference Materials and Measurements, European Commission, Geel (Belgium)
ISO	International Organization for Standardization
ISO REMCO	ISO Committee on Reference Materials
ITS	International Temperature Scale
IVD	<i>in vitro</i> Diagnostic
JCDCMAS	Joint Committee on Coordination of Assistance to Developing Countries in Metrology, Accreditation and Standardization
JCGM	Joint Committee for Guides in Metrology
JCRB	Joint Committee of the Regional Metrology Organizations and the BIPM
JCTLM	Joint Committee for Traceability in Laboratory Medicine
KCDB	BIPM Key Comparison Database
KCRV	Key Comparison Reference Value
KEBS	Kenya Bureau of Standards, Nairobi (Kenya)
KRISS	Korea Research Institute of Standards and Science, Daejeon (Rep. of Korea)
LATU	Laboratorio Tecnológico del Uruguay, Montevideo (Uruguay)
LCAE	Laboratoire Central d'Analyses et d'Essais, Tunis (Tunisia)
LGC	LGC (formerly Laboratory of the Government Chemist), Teddington (UK)
LNE	Laboratoire National de Métrologie et d'Essais, Paris (France)

LNE-LNHB	LNE Laboratoire National Henri Becquerel, Gif-sur-Yvette (France)
MAS	Metrology, Accreditation and Standardization
METAS	Federal Office of Metrology, Bern-Wabern (Switzerland)
MIKES	Centre for Metrology and Accreditation/ <i>Mittatekniikan Keskus</i> , Helsinki (Finland)
MKEH	Hungarian Trade Licensing Office, Budapest (Hungary)
MoU	Memorandum of Understanding
MRA	Mutual Recognition Arrangement
NCSLI	NCSL International, Boulder, Co. (USA)
NEWRAD	International Conference on New Developments and Applications in Optical Radiometry
NIBSC	National Institute for Biological Standards and Control, Hertfordshire (UK)
NIM	National Institute of Metrology, Beijing (P.R. China)
NIS	National Institute for Standards, Cairo (Egypt)
NIST	National Institute of Standards and Technology, Gaithersburg, Md. (USA)
NMI	National Metrology Institute
NMIA	National Measurement Institute, Australia, Lindfield (Australia)
NMIJ	National Metrology Institute of Japan, Tsukuba (Japan)
NMISA	National Metrology Institute of South Africa, Pretoria and Cape Town (South Africa)
NOAA	National Oceanic and Atmospheric Administration, Washington DC (USA)
NPL	National Physical Laboratory, Teddington (UK)
NPLI	National Physical Laboratory of India, Delhi (India)
NRC	National Research Council of Canada, Ottawa (Canada)
NRC-INMS	NRC Institute for National Measurement Standards, Ottawa (Canada)
OIML	International Organization of Legal Metrology/ <i>Organisation Internationale de Métrologie Légale</i>
PTB	Physikalisch-Technische Bundesanstalt, Braunschweig and Berlin (Germany)
QS	Quality System
RMO	Regional Metrology Organization
RRI	BIPM Staff Regulations, Rules and Instructions

SADCMET	Southern African Development Community Cooperation in Measurement Traceability (region of AFRIMETS)
SI	International System of Units/ <i>Système International d'Unités</i>
SIM	Inter-American Metrology System/ <i>Sistema Interamericano de Metrología</i>
SIR	International Reference System for gamma-ray emitting radionuclides/ <i>Système International de Référence pour les mesures d'activité d'émetteurs de rayonnement gamma</i>
TAEC	Tanzania Atomic Energy Commission, Arusha (United Rep. Tanzania)
TC	Technical Committee
TG-SI	CCT Task Group on the SI
UK	United Kingdom of Great Britain and Northern Ireland
UNIDO	United Nations Industrial Development Organization
US	United States of America
USA	United States of America
USSR	former Union of Soviet Socialist Republics
VAMAS	Versailles Project on Advanced Materials and Standards
VIM	International Vocabulary of Metrology, Basic and General Concepts and Associated Terms (3rd edition)
VNIIFTRI	National Research Institute for Physical-Technical and Radio Engineering Measurements, Rostekhnregulirovaniye of Russia, Moscow (Russian Fed.)
VNIIM	D.I. Mendeleyev Institute for Metrology, Rostekhnregulirovaniye of Russia, St Petersburg (Russian Fed.)
VNIIMS	Russian Research Institute for Metrological Service, Rostekhnregulirovaniye of Russia, Moscow (Russian Fed.)
VOC	Volatile Organic Compound
WG	Working Group
WGFF	CCM Working Group on Fluid Flow
WHO	World Health Organization
WMD	World Metrology Day
WMO	World Meteorological Organization