

**Report on the 7th meeting of the JCRB held at the BIPM  
on 8 and 9 October 2001.**

Revised version 10 December 2001

**Present:**

T.J. Quinn	BIPM (Chairman)
R. Kaarls	CIPM (secretary)
H. Imai	APMP
K. Seta	APMP
B. Inglis	APMP
Shi Changyan	APMP
V. Belotserkovskiy	COOMET
D. Vassiliev	COOMET
A.I. Pokhodun	COOMET
A. Astashenkov	COOMET
L. Issaev	COOMET
W. Schwitz	EUROMET
A. Wallard	EUROMET
P. Hetherington	EUROMET
T.M. Plantenga	EUROMET
H. Ugur	MENAMET
F. Hengstberger	SADCMET
I. Castelazo	SIM
H. Semerjian	SIM
C. Thomas	BIPM
L. Le Mée	BIPM

A list of the participants with their affiliation and co-ordinates is added as Appendix 3 to this report.

## **1. Opening and welcome by the Chairman**

The Chairman, Dr T. Quinn, opened the meeting welcoming the representatives of the RMOs and their accompanying experts in the new meeting hall of the BIPM.

The draft Agenda was approved, noting that a letter received from EUROMET and a few other points will be dealt with under point 15: Other business.

A list of the 22 working documents tabled is also attached as Appendix 4. The Appendices are also on the JCRB website [www.bipm.org](http://www.bipm.org)

## **2. Matters arising from the report of the 6th meeting of the JCRB**

Documents 6 (APMP) and 9 (SIM) addressed points in the report of the previous meeting. However, document 6 was withdrawn during the meeting and not further discussed. Document 9 refers to the proposed statement to be put on calibration and measurement certificates from NMIs. Following a discussion, the text was amended and the JCRB adopted the following text:

This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognize the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (for details see <http://www.bipm.org>).<sup>1</sup>

---

<sup>1</sup> Note: In making a French version it became clear that in French it is necessary to be more explicit than in English. The following is the French text that has also been agreed with L. Erard on behalf of the BNM:

Ce certificat est en accord avec les aptitudes en matière de mesures et d'étalonnages (CMCs) figurant dans l'annexe C de l'arrangement de reconnaissance mutuelle (MRA) rédigé par le Comité international des poids et mesures (CIPM). D'après les termes du MRA, tous les laboratoires participants reconnaissent réciproquement la validité des certificats d'étalonnage et de mesurage pour les grandeurs, domaines et incertitudes de mesure mentionnés dans l'annexe C (pour plus de détails, voir <http://www.bipm.org>).

The JCRB proposes that each RMO and country be responsible for preparing texts in its own language. It is requested that copies of the various language texts be sent to the Chairman for the JCRB archives.

### **3. Report by the Chairman on progress since the 6th meeting**

The Chairman gave a brief report on recent progress drawing attention once again to the huge amount of work that is represented by the growing content of Appendix C. He asked RMO representatives to pass on his appreciation and thanks to the contact persons in each RMO and in each field upon whose shoulders a great responsibility lies for the operation of the whole system. The fact that we have progressed so far so fast is in large part due to their efficiency and hard work. In this connection the Chairman also mentioned the need for close co-operation between the RMOs and the CCs and their Working Groups. The CCs are playing a role in the whole exercise, in particular the CC WGs on Key comparisons. At the occasion of the review in 2003 one may consider whether some additional rules for the whole process are needed.

Further, the Chairman mentioned the leaflet that he had prepared as suggested at the 6th meeting. The question of publicity for Appendix C was raised. It was proposed that at the PittCon in March 2002 and also at the NCSL in August 2002, the BIPM take a stand and have a live demonstration of the database. The Chairman agreed to look into this. It was also suggested that short texts be made available for inclusion in newsletters published by NMIs and other organizations, like ILAC, ISO, IFCC/WHO, WMO, WTO, EURACHEM, CITAC, EUROLAB, etc.. The Chairman agreed to prepare a short text suitable for this. Other matters related to the progress of the MRA come up in later points of the agenda.

### **4. Report on the KCDB**

Claudine Thomas informed the representatives that the BIPM database related to the CIPM MRA is in fact “The BIPM key comparison and calibration and measurement capabilities database – KCDB”. This title is however too long, so thus there is no shorthand way of referring to the KCDB other than what was written in the MRA, namely “key comparisons database”. She then gave a presentation of the KCDB and answered many questions. It was agreed that the BIPM will begin now to make a log of the numbers and, if possible, the origin of who uses the KCDB.

The Chairman reported that on a number of occasions, members of CCs and working groups had questioned the need for the Tables of bilateral equivalence presented on the KCDB Appendix B. Although this was not strictly the responsibility of the JCRB he asked for its opinion. The general view was that these Tables were not necessary provided that, instead, instructions were given for calculating the bilateral equivalences if these were required.

The JCRB expressed its appreciation to Claudine and other BIPM support staff for all the work done to make the KCDB a success.

### **5. Reports by RMO representatives**

Each RMO Representative presented a report on recent activities. These are on the JCRB website (see documents 7, 10, 14, 16 and 18). H. Ugur, representative of MENAMET reported that at present MENAMET is not active and he has no report to present. It was subsequently agreed between H. Ugur and the Chairman that for the time being MENAMET will be deleted from the JCRB interactive website [www.bipm.org/JCRB](http://www.bipm.org/JCRB)

Several RMOs reported that there is a growing interest in becoming either a Member State of the Metre Convention or an Associate of the CGPM.

It was agreed that a common format for RMO reports to the JCRB should be used. A draft of such a list of contents was agreed and is appended to this report as Appendix 2 (document JCRB-7/22).

### **6. and 7. The JCRB website and communication within the RMOs and between the RMOs and the BIPM**

These two items were taken together. There was a full discussion of the JCRB interactive website and a number of suggestions for modification were made. The JCRB decided that henceforth final, corrected, CMC files sent to the BIPM after inter-regional review will be posted on the interactive JCRB website for a period of not more than one month. By the end of this period, RMO representatives should indicate on the interactive website their approval after which the CMCs will be entered into the Appendix C. A warning will be sent if time limits are

exceeded or no answer is received. In the case of approval not being given by one or more RMOs, the CMCs will remain under review until the problem has been resolved. (*Note from the Chairman: The interactive website has been modified and the new version was put online on 24 October 2001. RMO Representatives are asked to be sure to place on the interactive website the appropriate information concerning whether or not they will review a given CMC and by what date.*)

### **8 A. Inter-regional review of CMCs**

Documents 3, 5, 8, 11, 12, 19 and 20 addressed this topic. Document 3 was held over until item 11. The recommendations given in document 5, were in principle accepted. There was a discussion on the rules for inter-regional review as presented in the Chairman's letter to RMOs dated 24 November 1999 and updated by the 5th JCRB and published as document JCRB-5/1. The JCRB requested the Chairman to look at these rules to see if they needed any updating. (*Note from Chairman: at first sight these rules seem to be adequate for the present except for minor revisions to take account of the procedures now used with the JCRB website; a slightly revised version, labelled JCRB-7/1 is appended as Appendix 1 to this report.*) The points made in SIM document JCRB-7/11 were discussed and the JCRB accepted the proposals 1, 3 and 4 but thought that as regards point 2, it must be only the RMO representative who can actually change the interactive website.

When judging the CMCs, the question arises as to what is the real capability and competence of the NMI claiming the CMC and how much confidence do we have in the claim. This arises particularly when the NMI concerned is not well known to the reviewer; this is an even more burning question when there is no key comparison backing up the claimed CMC. The JCRB decided to ask the CCs to make statements on "how far the light is shining" in the report of each key comparison.

In Appendix C only the best calibration and measurement capabilities routinely available will be listed. This means "those services that are published (either on paper or electronically) by the NMI in its brochure or catalog of services available to their customers". Capabilities available at lower accuracy levels should not, in general, be listed in Appendix C, although certificates delivered for these lower level services may carry the MRA Statement (see above). However, it was remarked that in principle NMIs should not compete with accredited laboratories.

### **8 B. Inter-regional review of chemistry CMCs**

A report was given by R. Wielgosz of the BIPM on the meeting of regional contact persons held at the BIPM on 5 August 2001 and subsequent teleconference on 13 September. The report of the meeting was distributed. As a result of the meeting it was agreed that the final date for sending to the BIPM final files arranged according to the format agreed at the 7th CCQM meeting would be 15 January 2002. In the Appendix C search engine it had been agreed at the August meeting to add a filter on the service category just above the keyword search. Further harmonization of service categories may still be needed.

In order to avoid unfair competition between the NMIs much more co-ordination is needed in areas where capabilities are of a multi-disciplinary character e.g. electrical conductivity, viscosity and reference materials. Electrical conductivity is a crucial chemical measurement. With respect to viscosity for the time being the *ad hoc* Working Group on Viscosity, established two years ago by the CIPM, is the co-ordinating body. With respect to Certified Reference Materials the proposal was made that CRMs of content are part of the CCQM and CRMs of properties are part of other fields/CCs.

It was also decided that in relevant cases with respect to the uncertainty claims of CRMs the following note in Appendix C may be added: "For this CMC  $k$  is not explicitly  $k=2$  but for some CRMs included in this CMC  $k$  may not equal 2, although all uncertainties have a 95% confidence interval".

## **9. Approval of CMCs for entry into Appendix C**

The following CMCs were approved for entry into Appendix C:

- a second set of CMCs in Photometry and Radiometry from APMP and EUROMET (published in KCDB on 10 October 2001);
- CMCs in Electricity and Magnetism from COOMET (published in KCDB on 24 October 2001);
- A second set of CMCs in length from EUROMET (published in KCDB on 30 October 2001);
- CMCs in general chemistry from APMP and SIM (to be published after 15 January 2002, see point 8B above).

The following CMCs were announced to be ready for submission after the 7th JCRB:

- CMCs in Acoustics Ultrasound and Vibration from SIM (approved on 30 October 2001, published in KCDB on 9 November 2001);
- CMCs in General Chemistry from COOMET (approved on 26 October 2001, to be published after 15 January 2002);
- CMCs in Photometry and Radiometry from SADC MET (approved on 26 November 2001, published in KCDB on 28 November 2001).

CMCs in General Chemistry from EUROMET are not yet ready because unresolved problems remain with some CMCs from BAM. The JCRB invited EUROMET to submit all the rest and let the BAM CMCs follow when ready. This was agreed but at the time of writing this report no EUROMET CMCs in general chemistry have yet been received.

CMCs in Photometry and Radiometry from SIM are due to be submitted by the end of November 2001 for electronic approval.

With respect to the CMCs in thermometry the CCT task force is still working on the service categories. After this task force is ready W. Schwitz will confirm the Chairman whether the CMCs already submitted by EUROMET are in conformity with the CCT list of categories.

Reviews in the field of mass are underway.

The Chairman tabled a document (JCRB-7/4) on a proposed procedure for modifying CMCs already in Appendix C. The JCRB agreed to consider this and discuss it at the March 2002 meeting of the JCRB. Meanwhile, the Chairman said that he would use this procedure if any cases arose.

Please note that a slightly modified version of JCRB-7/4 is now on the JCRB website.

#### **10. Interpretation of the phrase “significant unresolved deviation from the KCRV”**

The Chairman explained the origin of the request that the JCRB make a pronouncement on the meaning of the phrase in paragraph T.7 of the MRA “significant unresolved deviation from the KCRV”. After a short discussion the JCRB agreed with the Chairman that it is not appropriate that the JCRB pronounce on this point. Specific problems which may arise in a certain field should be discussed and eventually studied for example during a workshop on measurement uncertainty by the experts.

#### **11. Inter-regional harmonization of Quality System reviews.**

Document JCRB-7/3 was presented by A. Wallard and a discussion followed. It was agreed that updated versions of the documents submitted by RMOs to the 5th meeting of the JCRB (and referred to in JCRB-5/1 as being substantially equivalent), should now be prepared for the 8th meeting of the JCRB. The updated RMO documents should be received by the JCRB Chairman by 1 February 2002.

An *ad hoc* Working Group is established to formulate the minimum requirements on what has to be reported about the review of the quality systems of the NMIs.

The members of this *ad hoc* WG are:

- P. Hetherington (convenor, Note; P.Hetherington replaces M. Plantenga)
- H. Semerjian
- K. Seta
- R. Kaarls

The report of the *ad hoc* WG will be sent to the JCRB Chairman before 1 February 2002. In 2003 the issues with respect to the quality systems of the NMIs have to be solved and should be transparent. It is understood that the evaluation of the situation concerning quality systems is in the first place a responsibility for the RMOs. The requirements to be formulated should be performance based. A regular review from time to time is needed and should also be part of the procedure.

Reference is made to an OIML paper on quality systems in legal metrology based on ISO 17025 and dealing with accreditation as well as peer reviews.

F. Hengstberger remarks that in developing countries there is a tendency that NMIs are accredited and then become internationally recognized under the ILAC Arrangement. (*Note from the Chairman: ILAC accreditation accredits the calibration services of a laboratory with reference to its standards; for an NMI, accreditation does not give any international recognition to its standards, only participation in the MRA can do this.*)

## 12. Preliminary discussion on review of MRA due for October 2003

The Chairman invited RMO representatives to consider if any part of the MRA would need revision in October 2003. The transitional period will end in 2003. Minimum requirements for monitoring the maintenance and validity of the CMCs have to be formulated, including eventually sanctions. He said that the responsibility will lie with directors of NMIs but advice from the JCRB would be welcome. He agreed to write to RMO representatives formally inviting them to consider this point.

## 13. Timetable for future submissions for Appendix C

The following timetable was agreed:

*Document JCRB-7/21*

### *Timetable for submission of CMCs to the JCRB for entry into Appendix C.*

**09 October 2001**

*The JCRB at its meeting in October 2001 confirmed the timetable for entries into the BIPM database for the year 2002. In this timetable we refer to the steps labelled (a) to (i) in the Rules of Procedure for CMC entry into Appendix C (Document JCRB-5/1).*

#### *1. For the March 2002 meeting of the JCRB (8th meeting):*

- *Deadline for submission of CMCs from the RMOs to the Chairman of the JCRB; step (b); submissions in the fields of temperature, flow, rest of length, rest of photometry and radiometry, mass and related quantities and ionizing radiation*  
**15 November 2001**
- *Date by which comments from RMOs must be received, step (e);*  
**31 December 2001**
- *RMOs send revised CMCs to the Chairman of the JCRB, step(g) ;*  
**31 January 2002**
- *Meeting of the JCRB;*  
**5-6 March 2002**
- *Publication in Appendix C;*  
**May 2002**

#### *2. For the October 2002 meeting of the JCRB (9th meeting):*

- *Deadline for submission of CMCs from the RMOs to the Chairman of the JCRB; step (b); submissions in the fields of time and frequency, parts of chemistry, and all remaining fields*  
**31 May 2002**
- *Date by which comments from RMOs must be received, step (e);*  
**31 July 2002**
- *RMOs send revised CMCs to the Chairman of the JCRB, step(g) ;*  
**31 August 2002**
- *Meeting of the JCRB;*  
**October 2002**
- *Publication in Appendix C;*  
**December 2002**

*T.J.Quinn  
Chairman, JCRB, October 2001  
(Revised December 2001)*

## 14. The content and responsibility for RMO databases

The Chairman reported that he had sent a draft contract to NIST for the proposed NIST/SIM database. He will inform RMO representatives when final agreement has been reached on this matter. F. Hengstberger indicated that SADC MET might also be interested in having a RMO database and that NIST had offered to help.

## 15. Other business

- (a) The Chairman informed the JCRB that a Memorandum of Understanding (MoU) was close to being finalized with ILAC. He said this will result in closer relations between the CIPM/BIPM and ILAC and in particular that ILAC will make clear reference to the CIPM MRA in its documents and the BIPM correspondingly in its documents will refer to ILAC.

- (b) The Chairman referred to a letter he had received from the Chairman of the CCEM working group on key comparisons in which a number of questions were asked (copy herewith). As regards the definition of services ordinarily available, the JCRB did not agree with the proposal that they be defined as only those services delivered under the quality system. Instead, the JCRB maintained its view that the presence of the service in a published (on paper or electronically) list of services offered by that institution was the necessary and sufficient condition. As regards the question of including or not the transport uncertainty in CMC uncertainty claims, the JCRB agreed to take up this question at its next meeting although it was noted that in general and in EA documents, transport uncertainty is not included in the uncertainty of the standard being calibrated but its performance during the calibration is.
- It is decided that W. Schwitz (convenor), I. Castelazo, F. Hengstberger and R. Kaarls will prepare a document on the issue, to be discussed at the next meeting of the JCRB.

As regards modifications to existing CMCs, the JCRB has agreed a provisional procedure on the proposal of the Chairman and will take this up at its next meeting. As regards the final point raised in the letter, the JCRB took the view that an NMI can change the values of its standards as it likes but it is necessary that any change be publicly announced and the reason for the change and its magnitude be made clear. Any implication for its CMCs must, of course, also be taken into account. The Chairman will reply on behalf of the JCRB to the points raised in this letter.

- (c) The Chairman was asked to clarify the rules regarding participation in key comparisons. He replied that this is not a matter for the JCRB but that he will take it up at the forthcoming meeting of the CIPM. (The Chairman will write to RMO representatives with the conclusion of the CIPM discussion on this subject).
- (d) Dr Schwitz mentioned the case where an NMI recognized for certain capabilities under the CIPM MRA is not recognized by a National Accreditation Body, being a signatory to the ILAC Arrangement. How does this fit in the relationship between ILAC and the BIPM. He will inform the JCRB Chairman in more detail, so that appropriate action can be taken.
- (e) Several points of a more general nature mentioned in the documents 7/2 and 7/15 will be presented to and discussed by the CIPM.

#### **16. Date and place of next meeting**

At the invitation of SADCMET, the next meeting of the JCRB will take place in Pretoria, South Africa, on 5 and 6 March 2002. The details of the programme and arrangements for the meeting will be distributed a little later. The Chairman then adjourns the meeting.

## JCRB Rules of Procedure for CMC entry into Appendix C

Revised October 2001

The Rules of Procedure of the JCRB adopted at its 2nd meeting in February 1999 specify the steps required for an NMI's calibration and measurement capabilities to be entered into Appendix C. These Rules were modified at the 5th meeting of the JCRB and put on the JCRB website as JCRB-5/1.

Since then, an interactive website has been created for RMO representatives to the JCRB to enter actions related to review of CMCs. It is also intended for other interested parties in the RMOs to be informed of the status of every CMC during the review process. This interactive website is at [www.bipm.org/JCRB](http://www.bipm.org/JCRB) and may be viewed using the login name "guest" and password "guest2001".

The creation of the interactive website has led to some modifications to the procedure. The revised procedure is as follows:

- (a) The NMI sends its draft CMCs to the local RMO for review and approval according to the JCRB and RMO criteria (see below for summary of criteria and JCRB statement).
- (b) The local RMO sends the approved CMCs to Chairman of JCRB with appropriate formal statement on behalf of the RMO representative to the JCRB. Reception of these CMCs is acknowledged on the JCRB interactive website with date.
- (c) Chairman of JCRB forwards received CMCs to all other RMOs through their representative on the JCRB. This action is noted on the interactive website with dates. RMOs indicate on the interactive website whether or not they will review these CMCs and set date for completion of review.
- (d) Inter-regional review takes place which includes direct contact between technical working group chairmen of RMOs; interim and final reports sent to Chairmen of their own RMO by each review team (see below for detailed rules on inter-regional review).
- (e) Reports of reviews are sent through JCRB representatives to Chairman of JCRB with an official accompanying statement and he sends them on to chairmen of other RMOs. These actions are noted on the interactive website with dates.
- (f) NMIs revise their CMCs as necessary and re-submit to local RMO.
- (g) RMOs send their revised CMCs to the Chairman of the JCRB with the appropriate formal statement stating that all issues raised in inter-regional review have been resolved.
- (h) Chairman of the JCRB puts revised CMCs on the interactive website setting a date not more than one month ahead for approval by RMOs. This and action (g) are noted on the interactive website with dates.
- (i) Provided all RMOs indicate their approval on the interactive website, the CMCs are entered into Appendix C. This action is noted on the interactive website with the date of entry.

**Criteria for acceptance of data for Appendix C**

Paragraph 11.3 of the MRA foresees (provisional) data for Appendix C until such time as the first round of key and supplementary comparisons has been completed and until the quality systems referred to in Paragraph 7 have been put in place. It is important to ensure a reasonable uniformity in the criteria used by the RMOs in submitting data to the JCRB for entry into Appendix C. The Chairman of the JCRB sent a letter to Chairmen of RMOs on 24 November 1999 in which he gave a summary of the points that should be taken into account. These points have formed the basis of the individual documents drawn up by RMOs specifying in more detail the criteria to be used.

The JCRB at its 5th meeting in October 2000 reviewed these criteria and reviewed the separate procedure documents prepared by the individual RMOs. It found that the procedures of the different RMOs were in good agreement with each other and with the criteria of the letter of 24 November referred to above. For clarity, the JCRB decided to restate these criteria in a slightly different form and made the following statement:

The JCRB requires that the following points should be taken into account in evaluating CMC submissions:

1. Results of key and supplementary comparisons.
2. Documented results of past CC, RMO or other comparisons (including bilateral comparisons).

3. Knowledge of technical activities by other NMIs.
4. Active participation in RMO projects.
5. Appropriate measurement procedures and equipment.
6. Scientific and technical qualifications of staff.
7. Other available knowledge and experience.
8. Quality system existing or in preparation, brief description.
9. Any peer assessment, third party accreditation or self declaration, including the name of the accreditation body; membership of a multilateral agreement/arrangement; scope of accreditation; names of peer reviewers.

The JCRB emphasized the importance of having a broad spread of information covering as far as possible all of these points. Before the results of key and supplementary comparisons are available, increased emphasis should be placed on points 2, 3 and 4 and particularly on the results of visits implied in 3. Before quality systems are fully in place item 7 takes on an increased importance and particularly the peer reviews mentioned in 9.

### **Procedures for inter-regional review of CMCs**

The JCRB at its 5th meeting in October 2000 made the following statement concerning inter-regional reviews of CMCs:

Inter-regional reviews of CMCs are principally to ensure that the agreed JCRB and RMO procedures have been correctly applied; they also assist in harmonizing RMO review procedures.

The JCRB recommends:

- that this inter-regional review should be carried out by the corresponding RMO working groups for the field in question;
- that these working groups should make a written report to their RMO Chairman;
- that this report should include the names of the members of the review team;
- that the review includes the detailed examination of a small number of the proposed CMCs chosen to evaluate the more critical CMCs.
- that the final reports should be sent to the Chairman of the JCRB who sends them on to RMO representatives on the JCRB.

The JCRB accepts that not every RMO will wish to review the CMCs of all NMIs in every other RMO; however, to ensure a reasonable coverage of review the JCRB recommends that the technical working groups of each RMO make contact and come to an agreement on sharing the task.

During the review process the JCRB recommends that communication is established directly between the appropriate working group chairmen to deal with questions and resolve, as far as possible, inconsistencies. Unresolved problems or disagreements that cannot be resolved by the technical experts must come to the RMOs and, if necessary, to the JCRB as foreseen in the MRA.

Suggested content of RMO report to the JCRB

1. General report on activities related to the MRA, RMO contact details including Chairman, Secretariat and JCRB representatives with their functions.
2. List of current TC chairs, contact details.
3. RMO membership update.
  - **Signatories of the Metre Convention, Associates to the CGPM, Participants in the MRA.**
4. Table of ongoing inter-regional review of the RMO's CMCs.
5. Table of CMCs reviewed from other RMOs.
6. Status of quality systems and review process in the RMO.
7. List of RMO key and supplementary comparisons in the region, with number of participants.