CITAC NEWS
Co-Operation on International Traceability in Analytical Chemistry
FEBRUARY 2004

Foreword by the Chairman

First of all, I would like to report that CITAC celebrated its 10 year anniversary at the CITAC events held in conjunction with BERM-9 on June 15-19, 2003, at Best Western Hotel Steglitz International in Berlin, Germany. At the CITAC members meeting on June 15 with 18 members and 9 observers, we discussed future activities to promote dissemination of traceablity in chemical measurements, stressing CITAC role of bridging gaps between National Metrology Institutes (NMIs) and field laboratories. I am very happy to announce that Ms Vera Poncano, Instituto de Pesquisas Tecnologicas, Brasil, was elected as Vice Chair of CITAC, her contribution as the position to CITAC greatly appreciated. After the CITAC 10th anniversary session of BERM-9 on the afternoon of June 16, we had a CITAC celebration dinner with former and current members. A specially designed medal carved with the CITAC logo was presented as a token of our thanks to the former CITAC Chairs: Bernard King (with message), Alan Squirrell and Wolfhard Wegscheider. We really enjoyed their pleasant, impressive and informative talk about what happened before and during their chairmanship. I realized again, as the tradition at CITAC meeting, a post-meeting dinner is as important as the formal session.

At the Berlin meeting, we decided to review and update the current CITAC terms of reference (TOR) to meet current and near-future requirements for CITAC activities. The new TOR, which were accepted by CITAC members for an initial term of three years, are presented on page 14.

It is not surprising for me that cooperation between CCQM/CIPM and Codex Alimentarius Commission in order to establish metrological traceability in the field of food analysis has just started, following the establishment of a Joint Committee on Traceability in Laboratory Medicine (JCTLM) in 2002. A Workshop on Comparability and Traceability in Food Analysis was jointly organized by CCQM and Codex Alimentarius Commission and held on November 18-19, 2003, at BIPM, Paris. Presentations on the topics were made by representatives from CIPM/BIPM, Codex Alimentarius Commission, NMIs, relevant international organizations, food industries, regulators and accreditation bodies. Many practical problems and difficulties in achieving comparability and traceability were pointed out because food analysis being carried out on diverse, complex, unstable and heterogeneous materials to determine a wide range of concentration (trace, minor and major constituents) of various measurands (chemical/physical properties and biological activities). We need to stand on the same platform for further discussion and for this reason availability of a Guide on comparability, traceability and measurement uncertainty in food analysis would be of great use and value for those who working on various areas related to food analysis. Since food safety is one of the most important and urgent issues today, as described in the TOR, CITAC is happy to jointly prepare such a Guide with Codex Alimentarius Commission, EURACHEM and other relevant international and regional organizations.

CITAC welcomes the new members: Professor Timo Hirvi, Center for Metrology and Accreditation (Finland), Dr. Arun K. Agrawal, National Physical Laboratory (India) and Mr. Peter Unger, American Association for Laboratory Accreditation (USA) who replaced our former members - representatives of the same organizations: Professor Veikko Komppa, Dr. Krishan Lal and Mr. Warren Merkel, respectively. Our special thanks are due to Veikko, Krishan and Warren for their contribution to CITAC.

We are going to co-host a CITAC/MSL Workshop on Traceability on May 3 -5, 2004 in Wellington, New Zealand. Another CITAC Workshop will be held in conjunction with 2004 Beijing International Symposium of Metrology in Chemistry on October 18 - 22, 2004 in Beijing, China. Your participation in future CITAC activities/events is very welcome.

Dr. Kensaku Okamoto
CITAC Chairman, NMIJ, Japan

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A Vision of CITAC´s Mission

First, I wish to thank the CITAC community for entrusting me with the position of Vice Chair of CITAC. I see this as a very important charge and would like to express some of my thoughts to you about CITAC in general and what this opportunity means to me specifically. I have previously shared these thoughts with colleagues in the Brazilian Program on Chemical Metrology and now, I would like to share them with you. The comments that follow will focus on my view on CITAC's mission and the need for more effective dissemination of concepts and practices regarding traceability for measurements in chemistry.

The infrastructure for the realization of traceability in chemical measurements can be approached in different ways, considering the breadth and scope of the field and the diversity of the needs. The CCQM has done a very effective job in establishing the infrastructure for assessing world-wide comparability for various quantities and measurands in chemistry. Information concerning the calibration and measurement capabilities (CMCs) of many national metrology institutes (NMIs) and other designated institutes can be found at the BIPM website (www.bipm.org).

When CITAC was created ten years ago, traceability had already been defined in the International Vocabulary of Basic and General Terms in Metrology (VIM) for a long time, but the concept and its application in the analytical chemistry laboratory were not widespread and not well understood. Also the CCQM was only beginning its work. During its short existence, CITAC has become a visible and very effective forum for discussing concepts and providing tools and examples that have allowed the VIM definition to "come to life" in field laboratories. The written documents CITAC has provided alone or in cooperation with other organizations like Eurachem are serving the chemical community very well. But even with these past accomplishments – there is still much more work to be done. Still the results from measurements made in many field laboratories need to be better connected to the measurement standards maintained by the NMIs and other institutions working at that level, in order to be able to establish reliable and comparable, internationally recognized, traceable measurement results.

Effective dissemination of traceability for chemical measurements is difficult because of the wide breadth and scope of the field and the very large variety of sample types that laboratories have to measure, as well as the very large number of different analytes, covering a wide range of concentrations that are being requested. Therefore, it is important to provide support to field laboratories stimulating the delivery of accurate, comparable reliable measurement results. CITAC´s greatest contribution in this area has been providing guidance, like the proper use of reference materials and guides for estimating uncertainties. In the past, CITAC has offered several workshops on these topics in a number of countries. However, there is a growing need for offering these activities to many other countries where trade, industry and society require more accurate, comparable and traceable measurements in chemistry. One way that this might been accomplished is through establishing more formal interactions between CITAC and Regional Metrology Organizations (RMOs).

So far, I have only mentioned the complimentary roles of CITAC and CCQM in improving the quality of chemical measurements and facilitating the dissemination of traceability to field labs. It is also relevant to consider that other entities like, Accreditation and Certification Organizations, Proficiency Testing (PT) Providers, Commercial Reference Materials (RM) Producers, Chemical Calibration Laboratories etc. play a significant role in this activity. So, better cooperation and integration will be required to effectively provide the traceability needed by field laboratories.

Well, I have tried to express some of the ideas that I have about CITAC and what some of its future activities should be:

- Filling the gap between NMIs and other designated institutes, for certain defined quantities/measurands and measurement ranges, and the field laboratories.
- Reaching a much broader audience through more formal interactions with RMOs, international and regional accreditation bodies, PT providers, RM producers etc.
- Better cooperation and integration of activities with other relevant organizations, acting in or coming from different sectors applying chemical analysis (for example in the food sector, drugs and pharmaceutical sector).

I am happy to serve as Vice-Chair of CITAC. Thanks again for your confidence in me, and I assure you that I will make every effort to uphold the high standards that have been established. I am quite sure that working together, we can accomplish this complex task.

Ms. Vera Poncano
Vice-Chair of CITAC
IPT, Brazil

Eurachem/CITAC Guide on Traceability in Analytical Measurements: A New Paradigm for Practical Traceability

A new and important Eurachem/CITAC Guide on Traceability in Analytical Measurements was accepted by CITAC in 2003 [1]. This new guide is expected to be particularly useful for routine laboratories who need to demonstrate traceability for accreditation to ISO 17025, but also sets out a practical general approach which can be applied across a wide variety of measurements.

Traceability to appropriate reference standards provides the units in which results are expressed, and assures the stability and comparability of measurement that is required for international trade and scientific research. Traceability is accordingly an important part of quality assurance for measurement. Existing guidance from EURACHEM and CITAC already covers measurement uncertainty evaluation [2], method validation [3], and general quality assurance for chemical measurement [4]. This latest guidance, agreed in 2003, provides practical guidance on establishing traceability for chemical measurement. Eurachem approved the Guide in May 2003, and CITAC in July.

The guidance is based on simple, but very general, principles (see Box 1, taken from the Eurachem/CITAC guide). These principles associate metrological traceability with the visible relationships between a measurement result and the values which influence the result directly; that is, the values used to control the measurement conditions ('control parameters') and those used to calculate the measurement result(s). Given this, it is simple to identify unambiguously whether a value forms part of the traceability chain or not; if a value is used in the calculation or used in controlling the measurement system, the measurement result is traceable to that value. This clarity is particularly useful where laboratories are required to demonstrate appropriate traceability, because if this equation and set of conditions is sufficiently complete, all that is necessary is to demonstrate that all these values are under sufficient control. Usually, that means traceable calibration for critical values (such as calibration materials and measuring equipment) and effective control or assurance for less important values.

This view is particularly valuable in clarifying the often confusing issue of traceability for 'empirical methods', that is, measurements defined operationally, such as 'crude fibre' or 'permanganate-oxidizable material'. Here, the measurand is defined by reference to a defined procedure. For example, crude fibre is the result of a procedure involving stated digestion times and temperatures with stated reagent concentrations. In terms of the new Eurachem/CITAC philosophy, this is simply a measurement result in which the control conditions x_{m+1} to x_n are particularly important. Since these are usually given in SI units, (such as the times, temperatures and concentrations in the crude fibre example), and every value used for control and calculation is traceable to approiate international reference values, it becomes clear that the results of these measurements are just as traceable to the SI as any other. Thus, for the first time, we have a consistent view of traceability which embraces all types of analytical measurement.

An important fundamental assumption in this philosophy is that the equation used to calculate the result is 'sufficiently complete'. Good science says we should always check such an assumption. Analysts already know how to do this effectively; this is the role of method validation. So in this new view, validation emerges as an essential activity in demonstrating completeness of traceability.

Finally, if we want to use a measurement result, uncertainty becomes important. If we need uncertainty in the result, we clearly need the uncertainty associated with values which affect the result. Thus, uncetainties on our reference values are important, and we see why a working measurement system, based on traceability, needs uncertainties at every stage back to the SI.

This picture of traceability associates the concept closely with the traditional activities of calibration and control. It is worth considering whether the overall picture is complete and consistent. The Figure illustrates the new philosophy schematically. We have identified validation and traceability (represented by the calibration circle) as separate activities in a larger picture, which also incorporates appropriate QA and QC (the third inner circle) and uncertainty estimation. This larger picture is the combination of activities necessary for reliable results; only when all are in place (shaded area **e** in the centre) can we substantiate a claim that we are presenting a reliable and traceable result. The activities themselves are conveniently considered separately; but it is quite clear that all are essential: Traceability assures international comparability of measurements; validation confirms that the method is adequate and (by checking our asusmption of completeness) that traceability requirements are met; internal QA and QC assure consistency of measurements within the laboratory, and

Summary of basic principles

1. We assume that an acceptable estimate y of the measurand value can be obtained from

$$y=f(x_1,x_2,\ldots,x_m)\,|\,x_{m+1},x_{m+2},\ldots,x_n$$

that is, y is calculated from $x_1 \ldots x_m$ using a relationship f which is valid under measurement conditions specified by $x_{m+1} \ldots x_n$.

2. Validation checks that the equation above is sufficient using suitable tests.

3. y is then considered *traceable* to $x_1 \ldots x_n$

4. Given that Eq 1 is sufficient, all that is necessary for complete traceability to appropriate references is that all the values x_1 to x_n are themselves traceable or defined values.*

In practice, it is sufficient to ensure that values x_1 to x_n are under sufficient control to provide the required uncertainty in y. For critical quantities, this requires traceable calibration against other reference values. For less critical quantities, less stringent control may be adequate.

*"Defined values": for example, unit conversion factors, mathematical constants, or the values of constants used to relate some SI units to fundamental constants.

uncertainty tells us how far we can rely on the end result in reaching decisions.

The new Eurachem/CITAC Guide is on the CITAC and Eurachem websites as a free download.

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2. Ellison SLR, Roesslein M, Williams A (eds.) "EURACHEM/CITAC Guide: Quantifying uncertainty in analytical measurement.", 2nd edition in English, EURACHEM, ISBN 948926-15-5, LGC Teddington (2000) (also available from http://www.eurachem.org/)
3. "The Fitness for Purpose of Analytical Methods: A Laboratory Guide to Method Validation and Related Topics", EURACHEM (1998), http://www.eurachem.org/
4. "Guide to Quality in Analytical Chemistry: An Aid to Accreditation", 2002 edition, Eurachem/CITAC 2002 (http://www.eurachem.org/, http://www.citac.cc/)

Dr. Steve Ellison
LGC, UK

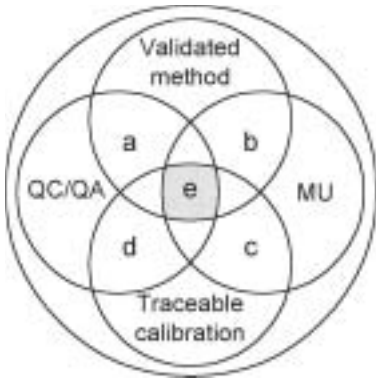

Figure: Elements of analytical quality

A New Working Group on Qualitative Analysis and Testing

Qualitative analysis is an important part of the work of many analysts. Examples include identification of a material, confirmation of identity, traditional 'spot tests', or spectroscopic checks for presence of a material. Many analytical reports from quantitative analysis, too, are actually reported in terms of a binary (yes/no) response; is the substance over a specified limit, or not? Decisions about the acceptability of a product, compliance with legislation, prosecution or clinical diagnosis can depend on the results, so it is important (as ever!) to be sure about their reliability. But how can the degree of confidence in a qualitative test result be assessed and conveyed?

While uncertainties associated with quantitative measurement results have been the subject of considerable activity since the publication of the ISO Guide on the topic, the issue of uncertainties in qualitative testing and analysis has received less attention. One thing is quite evident; though established uncertainty estimation principles may apply to the control of testing and measurement conditions, they can not be applied directly to the expression of uncertainty in qualitative measurement. A 'positive' result does not have a continuous range of values!

Instead, what is typically done is to assess method performance characteristics, such as false positive rates. Yet this simple-sounding term has at least three different meanings, depending on how it is calculated. Does it refer to the fraction of blank samples that give positive results? Or the fraction of all results that are incorrectly assigned as positive? Or even the fraction of all positive results that are incorrect? (At least two are in common use in different sectors). There are also important practical problems in obtaining reliable false response rates; for methods with low false response rates, a reliable measure of the false response rate may take many hundreds of tests. For spectroscopic methods of identification using databases, some idea of the false response rate might be obtained from the number of incorrect or similar 'hits'. Yet because such databases intentionally provide one good-quality spectrum per material, they rarely reflect the prevalence of materials in the population. That means that false response rates obtained in this way can be substantially incorrect in either direction. It is not surprising that publications on this topic have identified a need for guidance[1-3].

Thus, the Eurachem/CITAC workshop "Measurement uncertainty and traceability: meeting the requirements of ISO/IEC 17025" in Lucerne, June 2002, a workshop recommended the formation of a new working group to provide guidance on the topic. That recommendation has now been translated into a new joint Eurachem/CITAC working group on the topic. The main aim of the new working group is to prepare guidance on the assessment and expression of uncertainty in qualitative analysis and testing, and it is hoped that we will be able to work with other interested groups worldwide, to promote a sensible and harmonised approach to assessing and conveying confidence in qualitative measurement.

References:

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2. Ellison SLR, Accred. Qual. Assur. 5 346-348 (2000)
3. Ríos A, Barceló D *et al*, Accred. Qual. Assur. 8, 68-77 (2003)

Dr. Steve Ellison
Chairman, Eurachem/CITAC Qualitative Analysis Working Group

Activities of the Joint Committee on Traceability in Laboratory Medicine

The recently enacted European Directive 98/79/EC on *in vitro* diagnostic medical devices (IVD MD) requires, among other things, that "the traceability of values assigned to calibrators and control materials for *in vitro* diagnostic devices must be assured through available reference measurement procedures and/or reference materials of higher order". The definition of the term "higher order" was left undefined in the Directive. There are, however two ISO Standards (ISO/FDIS 15193 and 15194) that describe the essential requirements for higher order reference materials and methods.

To facilitate the identification of the "higher order" Reference Measurement Procedures and Certified Reference Materials (CRMs) that are currently available, the Joint Committee on Traceability in Laboratory Medicine (JCTLM) was created at a meeting held at the International Bureau of Weights and Measures (BIPM) in early June 2002. The aim of the Joint Committee is to meet the need for a worldwide platform to promote and give guidance on internationally recognized and accepted equivalence of measurements in Laboratory Medicine and traceability to appropriate measurement standards. The JCTLM Executive, which oversees the activities of the Joint Committee, is made up of representatives from the International Bureau of Weights and Measures (BIPM), the International Federation for Clinical Chemistry and Laboratory Medicine (IFCC) and the International Laboratory Accreditation Cooperation (ILAC). Professor Joseph H.H. Thijssen, The Netherlands and representing IFCC is the current Chairman of JCTLM. The secretariat of the JCTLM is maintained by the BIPM.

The sixty people present at the meeting represented the major international and intergovernmental organizations concerned with measurements in laboratory medicine, metrology, and health; the principal producers of IVD reference materials; the IVD industry associations from Europe, Japan and the USA; regulatory bodies from Europe, Japan and the USA; standards writing bodies; and accreditation and quality assessment organizations. The JCTLM created two working groups:

- Reference Materials and Reference Procedures
- Reference Laboratory Networks

The primary function of the working groups is to provide practical support to the worldwide IVD industry in establishing metrological traceability for values assigned to calibrators and/or control materials as required by the forthcoming European Directive *on in v*itro diagnostics and by comparable regulations in other countries.

Willie E. May (NIST) and Heinz Schimmel (EU Institute for Reference Materials and Measurements) are serving as Co-Chairs of JCTLM Working Group-I: Reference Materials and Reference Procedures. JCTLM WG-I is charged with establishing a process for identifying, reviewing against agreed upon criteria, and publishing a List of "higher order" Certified Reference Materials and Reference Measurement Procedures required for IVD industry compliance with the EC IVD Directive regard*ing in v*itro diagnostic medical devices.

Professor Dr. Lothar Siekmann, University of Bonn (Germany), and Professor Dr. Linda Thienpont, University of Gent (Belgium), are Co-Chairs of JCTLM Working Group-II. JCTLM Working Group-II is charged with:

- Collecting information on existing and candidate reference measurement laboratories (RMLs)
- Encouraging and facilitating the formation of networks of RMLs for different groups of measurable quantities (concerning electrolytes, substrates/metabolites, enzymes, HbA1c, low molecular hormones, etc.)
- Establishing a procedure for the approval of RMLs on the basis of their metrological level according to ISO 15195 and their performance as demonstrated in inter-laboratory comparisons linked to an NMI.

Current Activities:

In order to facilitate the review process, JCTLM WG-I agreed on eight highest priority analyte categories listed below and established Review Teams for each. To the extent possible, each Review Team had representation from IVD manufacturers, National Metrology Institutes, accreditation organizations, and professional societies from the US, Europe, and the Asia Pacific Region.

Analyte Category (With representative examples)	Review Team Chair
Coagulation Factors *WHO 2nd International Standard for Antithrombin Plasma, Human* *WHO 1st International Standard for Beta Thromboglobulin Human purified*	Elaine Gray, NIBSC
Drugs [therapeutic and "of abuse"] *Digoxin/ Digitoxin. Theophylline, Cocaine, THC-COOH*	Andre Henrion, PTB
Electrolytes *Calcium , Potassium, Sodium*	Richard Miller, Dade Behring
Enzymes *AMYLASE, CK, GGT*	Mauro Panteghini, Azienda Ospedaliera "Spedali Civili"
Metabolites and Substrates *Cholesterol, Creatinine, Glucose*	Michael Welch, NIST
Nucleic Acids *Hepatitis A virus RNA, Hepatitis B virus DNA*	Helen Parkes, LGC
Non-Peptide Hormones *Cortisol, Estradiol-17ß, Thyroxine*	Heinz Schimmel, IRMM
Proteins *Albumin, Troponin-I, PSA*	David Sogin, Abbott Laboratories

Nominations for higher order Reference Materials and Reference Measurement Procedures were solicited through a widely distributed open call where information was requested in common a format defined by templates that were provided for Reference Materials and Reference Measurement procedures.

JCTLM Working Group-I, has conducted four meetings to review nominations received for ~ 80 Reference Methods and 435 Reference Materials. The "higher order" Reference Materials and Reference Measurement Procedures identified through this review process [Reference Measurement Procedures for ~40 measurands and Reference Materials for ~100 measurands/analyte-matrix combinations] will be published in a database maintained by the BIPM. This List of "higher order" Standards will be publicly available on the BIPM, IFCC and other relevant websites by the end of March 2004.

The initial provisional List of Higher Order Reference Materials and Reference Measurement Procedures will be divided into two categories:

I. Certified Reference Materials and Reference Measurement Procedures for well-defined chemical entities or internationally recognized reference method-defined measurands, such as enzymes. Reference Materials included in this category are those that are traceable to the SI units [Electrolytes, Enzymes, Drugs, Metabolites and Substrates, Non-Peptide Hormones, some Proteins].

II. International Conventional Reference Materials, i.e. where the measurand(s) is/are not completely defined and/or no internationally recognized reference measurement procedure is available [e.g. WHO reference materials for Coagulation Factors, Nucleic Acids, some Proteins].

As the measurement science in this area is advanced to the point that category II measurands can be clearly defined and/or internationally-recognized reference measurement procedures are developed, reference materials could move from category II to category I. Measurands that cannot be included in either Category I or Category II are not traceable to a higher metrological order. These measurands are traceable only to a manufacturer's internal value assignment process. The List will be preceded by a preamble that clearly explains the contents of both components of the List and a brief explanation of the process used to determine which Reference Materials and Reference Measurement Procedures would be included.

A laboratory-based quality assurance audit program will also be initiated to provide measurement results that demonstrate the comparability of multiple "higher order" Reference Materials for the same analyte-matrix combination (measurand) on the list as well as to verify the veracity of the review process.

Based on the contents of the "List" and input from the medical professional, laboratory accreditation and IVD manufacturing communities, JCTLM WG-I will also identify highest priority needs for new CRMs and Reference Measurement Procedures. NIST, IRMM and certified reference materials producers in the European Union and the Asia Pacific region are discussing approaches for sharing the work-load involved in developing and maintaining any additional measurement standards needed.

If there are questions about JCTLM Working Group-I activities in general or any particulars about the review process please contact Dr. Willie E. May (willie.may@nist.gov) or Dr. Heinz Schimmel (heinz.schimmel@irmm.jrc.be).

Future Plans

During the coming year, the JCTLM Review Teams will continue to function in the eight areas already established. New JCTLM Review Teams for Blood Gases, Blood Groupings, Microbial Serology, Non-Electrolyte metals and Vitamins will be established in 2004. The next "open season" for nominations of Reference Materials and Reference Measurement Procedures will be February 1 - May 1, 2004. This "open season will be announced by a letter that will be distributed widely and also posted on the BIPM, IFCC and other relevant webpages in January, 2004. JCTLM WG-II is currently in the process of establishing criteria and processes for assessing the needed competencies of candidate Reference Laboratories which will include the establishment of networks for conducting "ring trials" to allow assessment of competence in the implementation of Reference Laboratory Procedures on a measurand-by-measurand basis. Data from the "ring trials" will also be used to assess the comparability different "higher order" Reference Measurement Procedures for the same measurand. The functions of the Review Teams will be expanded to include responsibility for evaluating the competence of candidate Clinical Reference Laboratories against ISO/FDIS 15195. Nominations have been received for more than 300 laboratory-measurand combinations. A more detailed account of JCTLM WG-II activities will be provided in an upcoming issue of this newsletter and the initial list of Clinical Reference Laboratories endorsed by the JCTLM should be available by late 2004.

An Implementation Protocols Team working under the auspices of JCTLM WG-I has been established to address issues regarding the IVD Industry use of the JCTLM-endorsed Reference Materials, Reference Measurement Procedures and Reference Laboratories. Led by Dr. Craig M. Jackson, Hemosaga Diagnostics Corporation, the Team is addressing issues such as:

- proposing a realistic schedule for the IVD industry to change from their use of existing reference materials and methods to the "higher order" JCTLM-endorsed standards;
- proposing various means for effectively communicating the availability of the listings of these higher order standards to the industry and any changes thereof;
- establishing appropriate mechanisms by which new candidate reference materials and methods can be reviewed for inclusion in the JCTLM database and for deletion of those no longer compliant or available;
- providing a forum for continued communication among all IVD stakeholders regarding availability of standards, commutability of materials, etc.

Dr. Willie May
NIST, USA

International Workshop on Proficiency Testing in Analytical Chemistry, Microbiology and Laboratory Medicine

A joint EURACHEM/EQALM/CITAC workshop entitled "Proficiency Testing in Analytical Chemistry, Microbiology and Laboratory Medicine" was held in February 2003 at Bracknell, United Kingdom. The workshop was organised by the EURACHEM PT Group. The workshop was attended by approximately 100 delegates, with a wide variety of disciplines and backgrounds, from twenty four different countries. The Workshop, opened by the UK Government Chemist (John Marriott, LGC), discussed current practice and future directions of proficiency testing (PT) and External Quality Assessment (EQA). Through a series of lectures and working group discussions, important issues regarding PT/EQA were discussed, which included:

- a tool for accreditation and regulators
- Accreditation of providers
- Regulatory aspects
- Frequency of participation
- measurement uncertainty
- Selection of programmes and development of EPTIS
- Global harmonisation and rationalisation
- New developments and challenges

The workshop produced a great deal of lively discussion and debate, and gave significant food for thought regarding the future directions of proficiency testing and external quality assessment.

Arrangements for the next international workshop on Proficiency Testing in Analytical Chemistry, Microbiology and Laboratory Medicine are now underway. The workshop is due to be held in Slovenia at the end of September 2005.

Dr. Dan Tholen, Consultant, USA

Dr. Brian Brookman
Chair, EURACHEM PT Group

Report on a NIST/CITAC Workshop at the Pittsburgh Conference Providing Measurement Results of Known Quality: How Do We Get There?

The intention of the workshop, held on March 12 2003, was to inform the chemical measurement science community gathered at PITTCON of the fine work underway in refining our understanding of quality in chemical measurements. If we can convey some practical experience and useful guidance, we will have been a success. The intent was to reach out to the well-intentioned scientist, who is faced with compliance to quality system standards, and to better enable them to understand and efficiently meet those standards, while perhaps enhancing the value of their work.

Workshop Program

Warren Merkel
"Increasing Need for Chemical Measurements of Known Quality"

Chemical measurement results are recognized as critical components of myriad products and decision-making processes. The users of those results are demanding to know the quality of the results, so they can be used with confidence. This talk, by a leader in the quality systems field, presented some of the mechanisms being used to deliver the goods - results of known and transparent quality.

Marc Salit
"Quality in Chemical Measurements: A Three-Legged Stool"

When chemical measurements results are reported from valid methods, with clearly established traceability, and reliable estimates of uncertainty, they are of known quality. These three attributes make up a quality paradigm for chemical measurements: valid methods assure that you are measuring what you say you're measuring; traceability assures that results can be compared across space and time; and reliable uncertainty estimates permits reasonable estimates of how a result might be expected to vary.

Alex Williams
"Establishing Traceability in Chemical Measurements"

Establishing traceability in chemical measurements is recognized as a critical element in quality results. While the principles of the traceability of chemical measurements are the same as those of physical measurements, chemistry presents significant problems of identity, interference, and morphology. This discussion presented a straightforward approach to establish traceability, as codified in a soon-to-be-released guide, "The Eurachem/CITAC Guide to Establishing Traceability in Chemical Measurements."

Wolfhard Wegscheider
"Evaluating Uncertainty in Chemical Measurements"

Evaluating uncertainty for chemical measurements is now a well- established

practice, and is described in the "The Eurachem/ CITAC Guide to Quantifying Uncertainty in Analytical Measurements, 2nd Ed." This guide has been available for over two years, and is widely used. A seasoned metrologist presented a discussion of application of the principles of the guide in a number of different analytical chemical analyses, and some real-life experience where uncertainty budgets made a difference in the interpretation of chemical measurement results.

Steve Ellison
"Validating Methods for Chemical Measurements"

Using a measurement method in a manner that hasn't been investigated to assure fitness-to-purpose jeopardizes the quality of chemical measurement results. This investigation is Method Validation. Valid methods have a defined scope of application (perhaps sample type, or sample form); a clear measurement model that can be used to calculate results, and for which an uncertainty budget can be evaluated; and have been demonstrated to be robust with respect to reasonably anticipated interferences. An authoritative discussion of method validation and its role in chemical measurements of known quality was presented.

Posters:
Lionel Spack
"Measurements of Known Quality in Practice"

A practicing analytical chemist from an industrial concern that relies on chemical measurement results of known quality discussed his experience with effectively delivering such results in a commercial environment. The speaker described the systems in place to assure proper method usage, traceability of results, and practical uncertainty estimates for results.

Greg Turk
"A Practical Tool for Establishing Traceability in Chemical Measurements"

A practical example is presented of establishing traceability of a result of a chemical measurement to a recognized reference standard. This discussion presented a tool that makes the comparison linking a result to a reference. This linkage is a straightforward illustration of the concept of traceability.

Dr. Willie May
NIST, USA

BERM9
Ninth International Symposium on Biological and Environmental Reference Materials

One of the sessions. First row on the left: Dr. Mike Sargent

The BERM Series of international conferences on biological and environmental reference materials started with a meeting in Philadelphia, USA in 1983 and soon became a focal event of the international reference materials community. The conferences are arranged every 3 years, with venues alternating between Europe and the USA. The 9th BERM, attracting well above 200 participants from 36 counties, was hosted by the BAM Federal Institute for Materials Research and Testing in Berlin on 15-19 June 2003.

The conference comprised 12 sessions with more than 80 lectures, two poster shows including about 80 posters, and a special workshop on applications of fluorescence techniques. Each session commenced with a keynote lecture, setting the scene for the topics addressed by the subsequent presentations.

In **Session 1** on ***General trends in the certification of reference materials*** the focus issue was the need for increased efforts concerning safeguarding homogeneity and stability of biological and environmental CRMs; data evaluation and processing, a.o. to obtain realistic uncertainty estimates for certified property data; better support for CRM users, a.o. concerning the scope of application of matrix reference materials. The session included a good number of controversial issues raising interesting discussions such as the use of accelerated stability studies and conditions for traceability of consensus values. In **Session 2** on ***Promotion of proper use of reference materials*** the recurring theme was the need for better information and education of the "field" analysts. The presentations fell into two groups, focussing on consequences of poor information, resulting e.g. in improper selection of CRMs for quality control or misjudging the stability of CRMs, and benefits of proper understanding of how CRMs, in-house RMs and PT can be used to improve analytical quality, respectively. **Session 3**, the ***CITAC 10th Anniversary Session on reference materials requirements for accredited laboratories*** was a dedicated CITAC event, chaired by Alan Squirrell, (see the separate session report on page 9).

Session 4 on ***CRMs for the natural health, dietary supplement, and phytomedicine market*** was rather a workshop than a conference session, giving room to extended discussions on the difficulties and challenges in this particular area. As a major conclusion, significant progress in this arena over the past three years following the previous BERM in Bethedsda was noted. Among others, this is due to progress in the consensus on scientific principles such as "representativity" of botanic materials. **Session 5** focussed on ***Specific regional needs for reference materials and quality control***, starting with a summary of experiences made by the IAEA on the impact of reference materials on the capacity building of developing countries. This was complemented by presentations reporting on recent progress in the preparation and use of CRMs in India, China and Brazil. **Session 6** was devoted to the ***Role of reference materials in assessing the properties of food***, addressing among others specific requirements on reference materials for the dairy industry, and reference materials for the evaluation of food authenticity. As a recurring

idea common to several presentations, larger numbers of less well characterised reference materials, e.g. spare PT samples, may be more benefical to the user community than a few exceedingly well characterised CRMs.

The lectures in **Session 7** on ***Quality control in monitoring the environment*** addressed a wide range of topics, including a.o. needs for speciation, effects of interactions soil/plant, plant/animal and food/man, needs for and benefits from particular reference materials. Recurring topics in this section were the need for reference soils of various types and terminology. **Session 8** ***Role of reference substances in the pharmaceutical industry*** highlighted the programs, basic requirements and procedures for pharmaceutical reference substances of the United States Pharmacopoeia and the European Pharmacopoeia as well as regulation and inspection in this field. Special issues included a.o. the preparation and use of freeze-died urine samples as reference materials for doping control. **Session 9** on ***Approaches to fulfill requirements of the food and feed labelling legislation*** was entirely devoted to the topic of genetically modified organisms (GMO), a.o. considering new types of reference materials (e.g. genomic and plasmid DNA), implications of DNA degradation, and validation of the performance of critical analytical steps such as extraction and PCR.

Session 10 ***Impact of the IVD directive on the need and development of clinical reference systems*** started with a comprehensive overwiew of recent international developments aiming to establish a reference system for clinical measurements comprising reference laboratories, reference methods and reference materials, a.o. resulting in a series of ISO/CEN standards and formation of a new international committee (the JCTLM). Subsequent presentations highlighted current activities of the new committee to identify suitable reference methods and reference materials, commutability of RMs, impact of RMs, and industry perspectives. **Sessions 11** and **12** on ***The role of reference materials in maintaining safety and quality of food*** focussed on issues concerning toxins and residues, and issues concerning pathogenic organisms and molecules, respectively.

Presentations and session reports are available on the BERM9 website which is maintained on the EUROLAB website under http://www.eurolab.org/berm9.

Dr. Werner Hasselbarth
BAM, Germany

CITAC 10TH Anniversary Session on Reference Materials Requirements of Accredited Laboratories

BERM, 9-16 June 2003, Berlin, Germany

I chaired this session in Berlin. It was well attended and there was good audience participation. More than ever we need "global-equivalence" (and confidence) in our chemical and biological measurements so that they are fit for their intended use. It is now recognised that the correct use of good quality reference materials plays an important role in achieving this goal. The session promoted further debate and interest. Certainly metrology in chemistry and biology is now firmly on the map – but it is clear we still have much to do!

A short summary of the six presentations follow:

ALAN SQUIRRELL and LAURIE BESLEY (co-presenters)
Reference Material requirements for laboratories and the role of accreditation bodies
Alan Squirrell outlined the requirements of ISO/IEC 17025 with respect to reference materials and stressed the importance of the laboratories need for good quality reference materials which were fit for their intended use. Laurie Besley mentioned that laboratories sometimes did experience difficulties in ascertaining whether a particular reference material was indeed suitable and cited some examples where the documentation accompanying reference materials was inadequate.
Both presenters stressed the need to more forward in a cooperative manner and highlighted the important role of existing international bodies (eg ILAC, REMCO, IAGRM, CITAC and other laboratory associations) in addressing the fundamental issue of closely linking accreditation to metrology and thus producing more accurate measurements.

W. G. IKINS
Selection and use of Reference Materials in ISO/IEC 17025 accredited laboratories
Bill Ikins gave an overview of the role of reference materials within the overall quality system of the large network of Siliker laboratories (North America) and highlighted the importance of on-going quality control and the matching of specific reference materials with AOAC official methods on food analysis.

LAURIE BESLEY
A producer's view of applications of pure substance Reference Materials in sports drug testing
Laurie Besley gave an overview of the Sports Drug Program at the National Analytical Reference Laboratory (Australia) and stressed the challenges in this (high-profile) area, both in terms of "identification" and "quantitation" requirements. He mentioned that the accreditation process (to ISO Guide 34) had provided a transparent mechanism to provide confidence in the quality of these complex reference materials.

ILYA KUSELMAN
Development of in-house Reference Materials with traceable property values
Ilya Kuselman gave two examples of the development of in-house reference materials (IHRM), with traceable property values. He emphasised the value of a comparative approach (simultaneous analysis of IHRM and CRM under the same conditions), particularly in controlling bias, and the need to address homogeneity and stability issues.

JOHN P. HAMMOND
Establishing and operating a Certified Reference Materials (CRM) calibration laboratory compliant with ISO/IEC 17025

John Hammond outlined the process in achieving calibration laboratory accreditation to ISO/IEC 17025 (by UKAS) and the benefits for his company, particularly in marketing the CRMs (for UV-visible spectrophotometers) on a world-wide basis. He looked forward to world-wide harmonisation and global acceptance of such a "formal recognition" process.

WERNER HASSELBARTH
Reference Materials and reference producers – Competitive or complementary fields?

Werner Hasselbarth promoted the use of the terms "reference sample" and "reference value" in relation to method development and validation. In addition he provided viable alternatives (when a CRM is not available as the reference sample) and this included characterisation by a "reference laboratory" (preferably using a "reference measurement procedure"). He stressed the importance of commutability considerations for matrix reference materials.

In summary, a successful session I think, Certainly it gave us the impetus for the evening "session" where CITAC members and their guests celebrated their 10th anniversary in style! Let's hope that the good work continues in 2004.

Alan Squirrell
ILAC Secretary

The 2nd International Conference on Metrology Trends and Applications in Calibration and Testing Laboratories

4-6 November, 2003, Eilat, Israel

One of the sessions. In the first line from left to right there are Dr. Avi Shenhar, Dr. Ilya Kuselman, Prof. Paul De Bievre and Dr. David Kisets.

The conference was opened by the Chairman, Dr. Avi Shenhar, Israel, who has introduced the first lecturer Mr. M.Ratzon, a member of the Israeli Parliament (Knesset), Deputy Minister of Industry, Trade and Labor of Israel. Mr. Ratzon said that it was a good idea of the conference organizers to propose to metrologists and chemists-analysts to seclude themselves from their offices and the routine life for this meeting with colleagues in such a wonderful place in a year-round resort at the Read Sea beach at Israel's southernmost tip.

Then Dr. A.Huli, Chairman of the Israel Society for Quality, gave his prominent lecture titled "National excellence and quality of life as a result of better products and better services" and demonstrated a short film on the topic. Afterwards, the conference discussed the lecture by Dr. I.Kuselman, CITAC Secretary, on the CITAC mission, objectives and strategies for development of metrology in chemistry, the lecture by Dr. O.Dreazen, Director of the Israel Laboratory Accreditation Authority, on the ILAC role in implementing good metrological practice, and the lecture by Mr. G.Deitch, the Israel Commissioner of Standardization, "Metrology as component of quality infrastructure in Israel".

The round table discussion "A revised international vocabulary of basic and general terms in metrology: dreadful or useful?" leaded by Prof. P. De Bievre, Consultant, Belgium, after the Plenary Session was also very interesting. The participants of the discussion were persuaded that the vocabulary would be finally useful.

During the second and the third days of the conference, metrologists and chemists-analysts worked in parallel sessions including the poster session. Chemical sessions were devoted to problems of uncertainty of qualitative analysis results, design of experiment for proficiency testing with limited number of participants, thinking on a national measurement system based on reference materials, choice of adequate reference materials, their traceability, metrology of sampling and to other hot topics of metrology in chemistry.

The Regional Meeting of the National Conference of Standard Laboratories – International (the Regional Coordinator – Dr. A.Shenhar) and the General Assembly of the Israeli Metrological Society (Chairman – Dr. I.Kuselman) took place in conjunction with the conference.

The second round-table discussion, on the third day of the conference, "Metrology: patent law and patent practice" led by Mr. M.S. Cohen, Chair of the Life Science Practice Group "Eitan, Pearl, Latzer & Cohen Zedek, LLP", Israel-USA, was very useful for both the metrologists and the chemists-analysts. This day the General Session on laboratory accreditation discussed the concept of target measurement uncertainty and two controversial topics, one concerning sampling uncertainty and its over-dramatization, and the other concerning benefits from unaccredited calibration (testing) certificates caused by the economical aspects of calibration and testing.

The selected conference presentations will be published in June or July 2004 in the special issue of the journal "Accreditation and Quality Assurance" dedicated to this meeting.

Dr. Ilya Kuselman
CITAC Secretary
INPL, Israel

International Workshop on Traceability and Uncertainty

3-5 May 2004, Wellington, New Zealand

First Announcement - Call for Papers

Dear Colleagues,

You are invited to attend the **CITAC (Cooperation on International Traceability in Analytical Chemistry) Workshop on Traceability and one day Uncertainty training course** proposed to be held in Wellington, New Zealand 3-5 May 2004. This workshop will be held at Te Papa museum located in central Wellington. For more information please contact local coordinator Dr. Laly Samuel at Measurement Standards Laboratory of New Zealand by email l.samuel@irl.cri.nz or phone DDI (64) 4-931-3490.

Workshop Programme

The aim of the workshop is to provide a clear description of the measurement infrastructures currently in place for chemical measurements, and how these can be utilised by 'field' laboratories to enable them to achieve reliable, comparable and traceable measurement results. Demonstration of traceability and estimation of uncertainty by 'field' laboratories will be the major theme of the workshop. Examples of how to achieve traceable measurements at 'field' laboratory levels in various areas will be given. The traceability chain and the role of NMIs (National Metrology Institute) and other authorities within this chain will be examined.

One of the objectives is to facilitate industry meeting the requirements of ISO 17025, *i.e.* being able to evaluate uncertainties and to have access to reference materials and measurement methods with sufficiently low measurement uncertainties. An important outcome of the workshop will be to identify the improvements in co-ordination and new activities which are required to enable traceable, comparable and reliable measurements to be achieved by 'field' laboratories.

It is our hope that this workshop will open a clear path over which the chemical and biological measurement community, government and regulatory agencies may travel to provide a new and unique opportunity for measurement traceability in coming years. CITAC and MSL request you to come and join us in Wellington to avail this excellent opportunity and to make this exciting possibility a reality.

Presentation

You are kindly asked to contribute to one or more of the following topics, sending a short description (approx. 200 words) to the contact person on or before January 30, 2004

- What is this Metrology in Chemistry
- Effective implementation of Metrology in Chemistry – Role of Government, regulators, industry and National Metrology Institutes
- Impact of metrology in chemistry on economy, trade, healthcare, environmental quality, and public safety
- The view of the metrologists, society, regulators, and industry
- Achieving Traceability in Chemical Measurements
- How to disseminate traceability to the working level
- Establishing traceability in a small country
- Role of Certified Reference Materials and proficiency tests (any field)
- Reference methods and method validation
- Matrix reference materials

Papers presented at the workshop will be reviewed for acceptance and publication in the international Journal "Accreditation and Quality Assurance" (Springer-Verlag)

One day Course on Measurement Uncertainty

Uncertainty in Chemical measurement
Uncertainty in Biological measurement
Estimation of measurement uncertainty - How to estimate measurement uncertainty in various measurement methods

The Venue

Te Papa is a unique venue for conferences, seminars and events. Te Papa, the National Museum of New Zealand, is a spectacular piece of modern architecture. The stunning waterfront setting puts you within easy walking distance of the central business district, government offices, restaurants, cafés, nightlife, shopping, and an excellent range of accommodation options. Te Papa is a 10-minute drive from Wellington's international and domestic airport.

Social Events

Several social events may be conducted including pre-and post-workshop trips to tourist spots, where New Zealand's unique flora and fauna can be explored. Ideal for nature lovers, Wellington is a city of hills, parks, reserves, beautiful sandy beaches, and spectacular bush walks, all within 20 minutes drive of the city centre. Further afield are the wineries of the Wairarapa, the wild beaches of the Kapiti coast, the unique predator free island reserve of Kapiti, numerous regional parks, and the Rimutaka Ranges. The geothermally active North Island is easily accessible by car, train, or plane, for those wishing to explore before or after the workshop, and frequent daily ferries and flights depart from Wellington to the beautiful and mountainous South Island. New Zealand's isolated position, large variations in climate, high biological diversity, and large number of endemic species makes it an ecologist's paradise. The autumn months of April and May are usually fine and settled, and there are good off-peak tourist rates.

Registration

Registration Fee: NZD 450 (One day : NZD 250)
Speakers : NZD 300
Students : NZD 150
Registration fees include participation in the programme, workshop proceedings, 3

lunches and tea breaks and workshop dinner.

Further

More details will be given in the second circular. If you are interested in attending or sponsoring the event, please register your interest in the attached format

Dr. Laly Samuel
MSL, New Zealand

2004 Beijing International Symposium of Metrology in Chemistry

October 18-22, 2004, Beijing, China - First Circular

The 2004 Beijing International Symposium on Metrology in Chemistry, under the auspices of CIPM/CCQM and CITAC, and organized by NRCCRM (National Research Center for CRM's of China), will be held on October 18~22, 2004 in the capital of China, Beijing.

The international symposium with the outstanding theme on "Metrology in Chemistry" will pay extensive attention to the situation and future of metrology in chemistry, reliable, internationally recognized traceability in chemical measurements, evaluation of uncertainty, certified reference materials, development and validation of measurement methods. In particular, internationally prominent scientists and experts on metrology in chemistry will be invited into the session, together with officers, scholars and manufacturers of instruments as well as producers of certified reference materials. This symposium will feature a plenary session to improve the international communication of metrology in chemistry, with the expectation to enhance the level of metrology in chemistry all over the world.

Scope of the Symposium:

A. The effects of Mutual Recognition Arrangement under the Inter-Governmental Treaty of the "Metre Convention" CIPM MRA on the international recognition of national measurement standards and related facilities, accreditation, certification and the international recognition of calibration and measurement certificates issued by the National Metrology Institutes as well as calibration, measurement and test reports issued by accredited calibration and test laboratories under the ILAC MRA;
B. Metrology in chemistry and society (environment, food safety, drugs, health care and clinical chemistry, public safety, and so on);
C. Traceability of chemistry measurements;
D. How to realize measurements with "traceable" measurement results;
E. How to establish a national infrastructure of traceablity in analysis and measurement;
F. How to evaluate measurement uncertainty;
G. Preparation, characterization, value assignment and application of standard/ certified reference materials;
H. Bio-analysis and metrology
I. Reaching on authoritative method of analysis and measurement
J. Metrology in chemistry and laboratory accreditation
K. The global metrological infrastructure in the field of chemistry, the CIPM MRA and its economic and social impact;
L. The developments with respect to traceability and a global infrastructure in the special fields of health care and food testing.

Call for Papers:

All unpublished papers are welcome. The abstract should contain concise information about the contents of the paper. Manuscripts of contributed papers should be prepared following the format to be specified in detail in the INSTRUCTIONS FOR AUTHORS. All accepted papers will be published, with the deadline for contribution July 31, 2004. Further more, some excellent papers will be selected for publication in **Accreditation and Quality Assurance**, with the deadline for revision November 5, 2004.

Symposium Language:

The official language of the symposium will be English.

Accommodation:

The symposium offers to arrange convenient hotel accommodation for participants. Further information will be given in the Second Circular.

Website:

Visit our website **www.nrccrm.org.cn**, for the **latest information** about the **symposium**.

Mr. Yadong Yu
NRCCRM, China

5th International Conference on Advances in Metrology

February 23-25, 2005, New Delhi, India - First Circular

Metrology Society of India and National Physical Laboratory are jointly organizing 5th international conference on metrology on February 23-25, 2005. This conference aims to focus on all the issues of metrology and particularly highlight the advances made in precision measurements in recent years. Earlier conferences had been attended by a large number of eminent international and national experts in different areas of metrology and provided a very good forum for fruitful interactions and exchange of ideas. We hope that the AdMet – 2005 will further strengthen the relationship between the researchers and industries at global level. The theme of this conference is: Metrology for Manufacturing Sector and Global Competitiveness.

Two special satellite events will also be organized in conjunction with AdMet - 2005. A pre-conference Workshop on Chemical Metrology on 22nd February and a 2-day Training Programme in Mass and Dimensional Metrology in 26-27 February, 2005. Many participants will like to avail this opportunity and participate actively in all these events and save time and money.

On our website http://www.metrologyindia.org the latest information about the conference and both the satellite events is available. Register your self with in few seconds by online submission of pre-registration form.

Dr. Ashok Kumar
NPLI, India

From Finland

The CITAC member of Finland changed last year, when the previous representative Professor Veikko Komppa retired after his long and active membership. Professor Komppa participated very actively in the work of CITAC and he was a representative of the whole Scandinavia. In Finland Professor Komppa has a central role in developing reliability of chemical measurements. For a very good reason he can be called "Mr. Reference Materials and Mr. Metrology in Chemistry" in Finland.

As the successor of Professor Komppa in CITAC was designated Professor Timo Hirvi, director of the Centre for Metrology and Accreditation (MIKES). MIKES is the National Metrology Institute (NMI) and acts as the national accreditation service (FINAS) under the Ministry of Trade and Industry.

Professor Hirvi will continue as the Finnish contact person for CITAC. Food chemistry and analytical chemistry have been the main research areas of Professor Hirvi. Before his present post he has worked as a scientist and head of department in government research institutes. Many national and international committees and working groups have used his expertise. He has been a member of Scientific Committee on Food in the European Commission. Professor Hirvi has been involved in the assessment of testing laboratories for several years.

Finland will do its best to continue to participate actively in the work of CITAC. Finland has many high level chemical laboratories, which are ready to co-operate in developing reliability of chemical and microbiological measurements. Many Finnish laboratories have a great interest particularly in metrology in chemistry, reference materials and uncertainty of measurements. A Finnish expert group of the metrology council for chemistry has published a guide for uncertainty of quantitative determinations derived by cultivation of micro-organisms. This report gives full directions for the daily routine of testing laboratories and it is available from MIKES or internet (www.mikes.fi/pubications).

Prof. Timo Hirvi
MIKES, Finland

From India

It is my great pleasure to accept the membership of CITAC. It will provide me an opportunity to take active part in its activities. My institute National Physical Laboratory, India is a NMI of the country and committed to maintain and disseminate national standards traceable to international measurement system BIPM/CIPM throughout the country. At present, we are in the process of establishing the facilities for chemical metrology.

NPLI is coordinating a national programme on preparation and dissemination of certified reference materials. Thirty top ranking laboratories of the country are participating in this programme. Twenty-one CRMs including trace elements in water, gas mixture, pesticides and X-ray diffraction have been prepared under this programme so far. We had participated in more than ten international comparisons organized by CCQM, APMP, NATA and IRMM. Concentration of various elements measured in water and food materials under these comparison programmes and most of the results were close to the median values. NPLI got international recognition due to successful participation in these programmes. Recently, it was decided to enhance the scope of the CRM activity in the areas of petroleum, food, alloys, ores and building materials to provide traceability in these disciplines of analytical chemistry also. We had already taken some actions in this regard

In present scenario of globalization of economies a new era of cooperation had been started and member countries are coming close and recognizing each other by bilateral and multilateral mutual recognition arrangements. I am very keen in learning of certified reference materials, traceability and measurement of uncertainty in analytical chemistry from my fellow CITAC members to promote such type of activities in my country. I assure that I will work with all the CITAC members for strengthening of the quality assurance system and traceability in analytical chemistry.

Dr. Arun K. Agraval
NPLI, India

Short CV

Peter Unger is President of the American Association for Laboratory Accreditation (A2LA). A2LA is a nonprofit, membership organization administering the second largest, comprehensive laboratory accreditation system in the world with over 1,600 laboratories currently accredited.

Mr. Unger has been involved with national laboratory accreditation since 1978. Prior to attaining his current position in April 1996, Mr. Unger served as Vice President of the Association and prior to that, was Associate Manager of Laboratory Accreditation at the National Bureau of Standards (now the National Institute of Standards and Technology).

Mr. Unger chairs the International Laboratory Accreditation Cooperation (ILAC) Arrangement Management Committee and chairs the Asia Pacific Laboratory Accreditation Cooperation (APLAC). Mr. Unger is the convenor of the Working Group on the ILAC Mutual Recognition Arrangement Documentation and co-chair of the ILAC/IAF Joint Working Group on Harmonization of Peer Evaluation Processes. He currently serves as ANSI expert to ISO CASCO working groups 18 – 17011, Accreditation Body requirements and 25 – 17025, Laboratory competence criteria. He also serves as ILAC liaison to the IAF MLA Management Committee and ISO CASCO WG 19 on Peer Assessment.

Mr. Unger has previously chaired the Training Subcommittee of the National Cooperation for Laboratory Accreditation (NACLA), the ASTM Committee E36, and the APLAC MRA Council.

Mr. Unger has a BS degree in systems engineering from Princeton University and a masters in environmental management from George Washington University.

Mr. Peter S. Unger
A2LA, USA

CITAC Terms of Reference

1. MISSION

To improve traceability of the results of chemical measurements everywhere in the world.

2. OBJECTIVES

To facilitate the practical realisation of traceability in chemistry: to develope concepts that can be applied broadly at analytical laboratories and to dessiminate those concepts;
To foster collaboration in metrology in chemistry as a mean of effecting technology transfer and cost sharing;
To promote the metrological principles through guidelines and other tools for analytical laboratories.
To promote and harmonise quality practices in the analytical laboratories.

3. STRATEGIES

- To provide a truly international forum for the exchange of information with respect to worldwide traceability of results of chemical measurements;
- To provide tools for analytical laboratories for establishing traceability to "stated references";
- To share views, clarify important concepts and raise the awareness of the needs and possibilities leading to traceability inchemical laboratories;
- To develop, distill and disseminate globally the key traceability concepts and issues;
- To prepare guides, discussion papers and scientific papers for journals in relation to traceability, uncertainty and quality assurance issues;
- To organise seminars, symposia and workshops and participate in conferences to promote the message of traceability;
- To play a bridging role between industry, governments, universities, metrologists and accreditation bodies and provide guidance to the analytical community;
- To work closely with other groups – e.g. CCQM, ISO-REMCO, IUPAC, ILAC, AOAC, regional and national professional chemistry societies and institutions, like EURACHEM and DAC/FECS, – without duplicating work already being conducted by other groups – using these societies and institutions to act as a conduit to the field laboratories ;
- To initiate and, where needed, coordinate work for the harmonisation and validation of analytical methods based on traceability and other metrological concepts.

4. CONSTITUTION

4.1 The members declare their common intention to actively take part in the work of CITAC and commit themselves to assisting in achieving its aims and objectives.

4.2 CITAC membership will be open to experts from any organisations which are actively interested in achieving the objectives of CITAC.

4.3 CITAC will meet to review and discuss specific tasks and will form its own rules of procedure. Sub-committees and task groups may be established as necessary to address identified areas of work or facilitate collaboration on tasks of mutual interest. A formal CITAC member meeting be held once per year, at which action plans are put in place for CITAC for the following twelve months, and a venue and date set for the next annual meeting. Additional meetings should be convened if (a) there is a useful agenda to address, and (b) at least 10 members are interested to participate. Such additional meetings should be proposed by the CITAC secretary at least three months in advance to give time for suggestions to be made for the agenda and to verify the number of the members interested to participate.

4.4 The CITAC members will elect a chairman, a vice-chairman and a secretary from its members for a period of three years. The secretary will normally provide the necessary administrative support.

4.5 In order to ensure breadth of expertise, the membership will be reviewed at each meeting and any new nominations will be considered.

4.6 All members can put forward proposals to CITAC for specific tasks to be carried out.

4.7 These Terms of Reference
- may be amended subject to 3 months' notice of the proposed amendments being given to all members and by the agreement of at least 10 members.
- remain in operation for an initial term of 3 years and will automatically continue in operation, providing at least 10 members support their continuance.
- are of an exclusively recommendatory nature. They do not create a binding legal effect on members.

5. FINANCIAL MATTERS

5.1 Members will normally cover the cost of their attendance at meetings and their contribution to any tasks being progressed by CITAC.

5.2 CITAC members will be required to contribute an annual membership fee, which shall be used solely and exclusively for CITAC business (e.g. operation of the Secretariat, publication of the newsletter, etc.). The fee shall be agreed by at least 10 members.

5.3 In the situation where two or more CITAC members are employed by the same organisation, only one annual membership fee shall be levied and these members will only have one voting right.

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