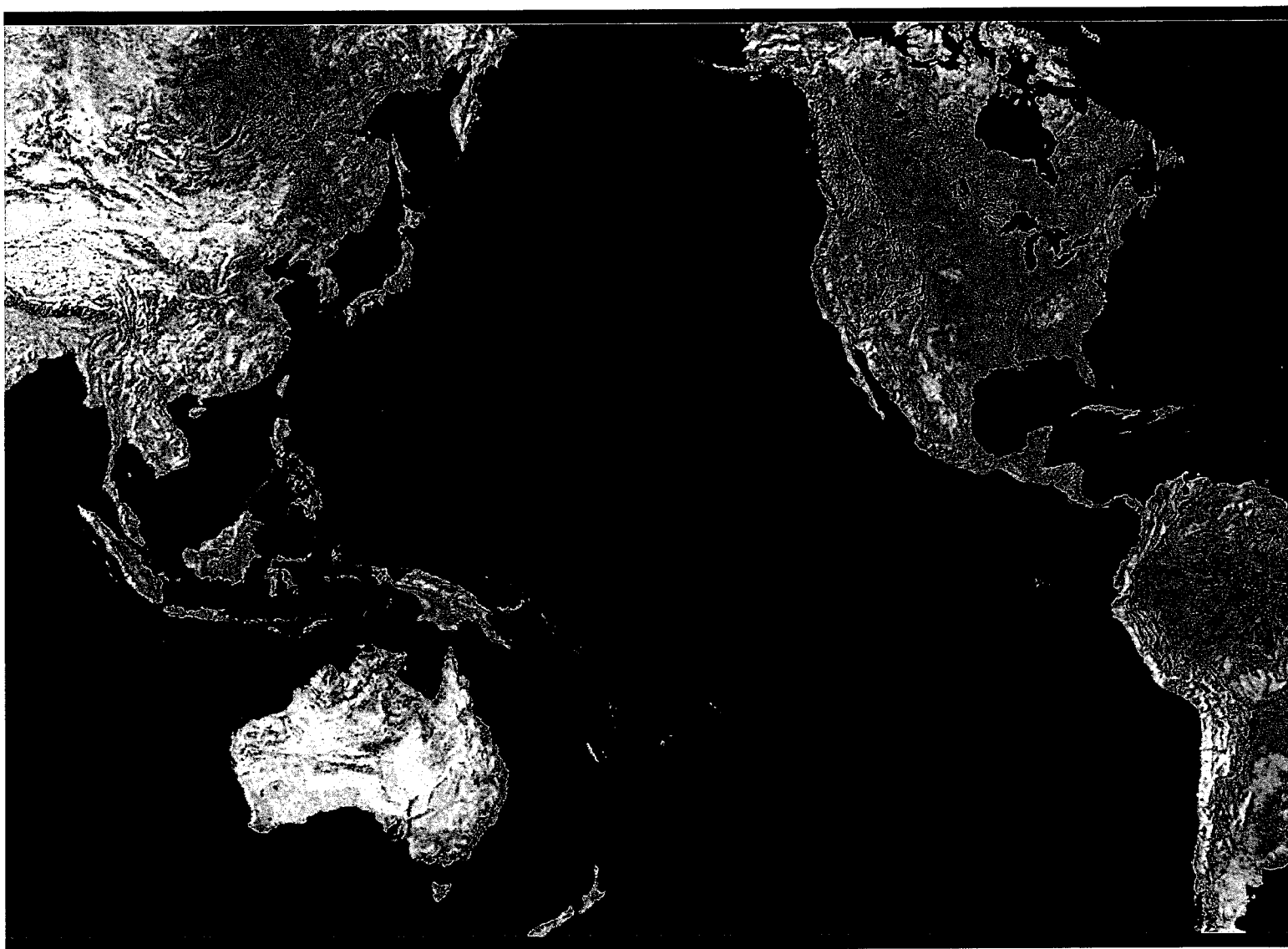


Survey of Legal Metrology
Technical Infrastructure Needs
in Asia-Pacific Developing Economies



ASIA-PACIFIC LEGAL METROLOGY FORUM

26 February - 25 March 1996

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FOREWORD

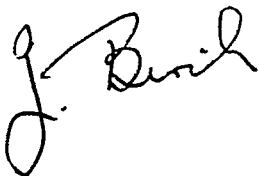
During the Asia-Pacific Legal Metrology Forum (APLMF) meeting in Beijing on 22 October 1995, it was agreed to conduct a survey of technical infrastructure needs of legal metrology in developing economies. The objective of the survey was to identify the key areas of the legal metrology technical infrastructure that needed development to promote harmonisation of technical requirements leading to mutual recognition agreements in the region. The importance of technical infrastructure has also been recognised by the Asia-Pacific Economic Cooperation (APEC) Standards and Conformance Subcommittee (SCSC) which has considered a medium and long term action plan to improve technical infrastructure development in the region by the year 2000.

The APLMF would like to gratefully acknowledge the Department of Industry, Science and Technology for providing funding for the survey which was carried out in nine developing economies, namely People's Republic of China, Indonesia, Republic of Korea, Malaysia, Mexico, Papua New Guinea, Philippines, Chinese Taipei and Thailand, from 26 February - 25 March 1996.

The Forum was fortunate in obtaining the services of Dr. Knut Birkeland to conduct the survey. Dr. Birkeland has recently retired as Director General of the Norwegian National Metrology Service and was also President of the International Organisation of Legal Metrology from 1980-1994. He has a unique insight into the development of legal metrology and through the Development Council, the needs of developing economies.

The survey focused on the areas of legislation, administration, calibration and testing, and training; relating to trade measurement, utility meters ie. gas, water, electricity, telephone, taximeters, and other legal measuring instruments (eg. environmental monitors, police traffic measurements, medical measuring instruments, health and safety measurements).

The survey has recognised the urgent requirements for the development of technical infrastructure in the Asia-Pacific region to promote confidence in measurement capability and has identified a number of high priority needs. It is hoped that this survey will spearhead the development of legal metrology programs in many of the economies which participated in the survey, either independently, or in cooperation with members of the Forum.



John Birch AM
Convenor
Asia-Pacific Legal Metrology Forum

May 1996

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CONCLUSIONS AND SUMMARY OF PROPOSED INITIATIVES

GENERAL

The present rate of development of funding for legal metrology technical infrastructure is negative, in a situation of urgent need for significantly increasing the level of funding to ensure the effective development of legal metrology technical infrastructure towards mutual recognition agreement.

Communication with the decision makers concerned needs to be much improved.

Two approaches have been proposed:

- Recommendation 1 - A Seminar, preferably in association with an APLMF meeting, on the economic and social benefits of legal metrology.
- Recommendation 2 - An audio-visual presentation of case studies of economic and social benefits.

(For details, refer to page 8).

LEGISLATION

With two exceptions, the legislative system in all member economies are currently under comprehensive revisions. The revisions are in principle modern extrapolations of the present legislative system, developed to meet national requirements and little concern seems to have been given to allow for international harmonisation and the implications of the GATT/WTO TBT Agreements and future mutual recognition agreement.

The implications of the GATT/WTO TBT Agreements and future mutual recognition agreement needs urgently to be studied and clarified to allow the current revisions to be fully harmonised.

Two complementary activities have been proposed:

- Recommendation 3 - As a matter of priority, a meeting of the APLMF Working Party on "model Law", focused on the minimum requirements of legal metrology legislation, to allow for the implementation of GATT/WTO TBT Agreements and mutual recognition agreement.
- Recommendation 4 - As a matter of priority, a meeting of the APLMF Working Party on mutual recognition agreement, focused on the principle requirements of mutual recognition agreement on the legal metrology technical infrastructure.

(For details, refer to page 10).

ADMINISTRATION

There are currently three main areas of important administrative changes in most of the technical infrastructure of the member economies.

One concerns comprehensive reorganisations of the legal metrology technical infrastructure, actually planned in Thailand, envisaged for Malaysia and wanted in Mexico and others.

The other deals with initiatives to co-ordinate the administrative infrastructure, mainly to cope with the present situation of multiple authorities and the increasing number of actors in the field of legal metrology.

The third relates to fundamental questions concerning funding.

Three activities are proposed to address these concerns:

- Recommendation 5 - A project on a "model" technical administrative infrastructure.
- Recommendation 6 - Seminars and other dissemination of information to encourage co-ordination.
- Recommendation 7 - An APLMF Working Party to examine the principles and possibilities of increasing legal metrology funding sources.

(For details, refer to page 14).

CALIBRATION AND TEST FACILITIES

There are four main areas of concern in this area.

One is the shortage of complete verification equipment at the inspector level, particularly for the verification of instruments of high capacity (that might generate an interesting level of fees). The present situation undermines rather than underpins mutual confidence. Generating higher incomes is probably the only efficient way.

Broken traceability chains, mainly between the inspector and the national level, is also a serious restraint for developing mutual confidence. This is basically a question of quality control. Giving top priority to accreditation by ISO Guide 25 and 58 for all levels of legal metrology enforcement would actually solve this problem. On the other hand, the traceability at the top of the traceability chains are satisfying.

In the most developed member economies, there is a need for facilities for high-tech metrological control, environmental, medical, ems, etc.

Facilities for pattern approval is generally scarce. It is proposed to look into possibilities for regional division of work.

Two projects of special R&D character are proposed:

- Recommendation 8 - A R&D project to develop a working measurement standard for the verification of field humidity meters for grain and rice.
- Recommendation 9 - A project to develop a harmonised method for the verification of electronic blood pressure meters. A project as proposed by Chinese Taipei is attached.

(For details, refer to page 17 and Appendix 1).

TRAINING

It is no surprise that the needs in the training area are quite massive, funding for training purpose has never had priority on the same level as equipment and salaries. On the other hand, there are promising plans to enforce existing training institutes and to establish new ones. In due time.

The pragmatic approach taken here is to support proposals for specific short term training in the internationally harmonised testing of non-automatic weighing machines and in the development of a training course module.

Many member economies base much of their national economy on the export of raw material, minerals, agricultural produce, crude or refined mineral oil. Quantification of this is by technically complicated high capacity trade instruments. Very great values are traded in all APEC member economies, by quantification through fluid flowmeters and large automatic weighing machines.

Member economies strongly supported proposals for seminar/ workshop training.

There is a promising increase of interest in international harmonisation, like OIML activities, but people are hesitant to participate actively. Proposals are made to improve this as well as general APLMF internal communication through Internet.

Six initiatives have been proposed and strongly supported, in the field of training:

- Recommendation 10 - The APLMF Secretariat establishes OIML pages on Internet to enable APLMF members to follow the current development of draft OIML Recommendations.
- Recommendation 11 - The APLMF Secretariat establishes the facilities to link up Forum members to facilitate communication including Pattern Approval Certificates.
- Recommendation 12 - A seminar/workshop be organised on fluid flow measurement of high capacity.
- Recommendation 13 - A seminar/workshop be organised on automatic weighing instruments of high capacity.

- Recommendation 14 - A training project "training for trainers", focused on the implementation of OIML R76, for the testing of non-automatic weighing instruments.
- Recommendation 15 - A project on the development of a "training course module" for the verification of specific legal metrology instruments in accordance with OIML criteria.

(For details, refer to page 19).

1. INTRODUCTION

This Survey was carried out by on-site visits to the APLMF representatives of the following APEC members economies

- Thailand
- People's Republic of China
- Republic of Korea
- Chinese Taipei
- Malaysia
- Indonesia
- Philippines
- Papua New Guinea
- Mexico

by Dr. Knut Birkeland, over the period 26 February - 25 March 1996, followed by a study and analysis of the information collected about the legal metrology technical infrastructure needs in the APEC member economies visited.

The Survey has, in particular, focused on the elements of a legal metrology technical infrastructure which are essential for future participation in mutual recognition arrangements, with a view of identifying the priority areas for technical infrastructure development in the region.

It concludes with a strategy to progressively remedy shortcomings in the technical infrastructure of these APEC member economies by appropriate initiatives such as Projects and Tasks that can be realistically achieved by the year 2000.

This is in line with the efforts to develop a program to improve the technical infrastructure within the region by the year 2000 as required by the APEC Action Agenda agreed upon by the APEC Ministers at their November 1995 meeting in Osaka.

2. BACKGROUND

2.1 Legal Metrology

Legal Metrology is the metrology concerned with measuring instruments and measurements *subject to governmental or official regulatory control*.

Legal Metrology is a responsibility to be maintained and implemented by or on behalf of the state, mainly in areas of conflicting interest and where special confidence in the measurement result is required.

Legal Metrology is *regulation and conformity assessment* in metrology. APEC member economies have recognised the importance of the harmonisation of metrological requirements and of conformity assessment in facilitating regional trade and investment.

The Legal Metrology bodies are the Regulatory authorities as well as the Certification and Inspection bodies in *all* fields where measuring instruments and measurements *are subject to governmental or official regulatory control*.

In our technically complicated world, the areas of conflicting interests are many, but all APEC member economies share a concern for dependable measurement when economic stability, health, safety and the environment of people are at stake.

It affects the daily life of all of us, from the simple measurement of goods at the marketplace and petrol at the dispensing pump to the complicated measurement of millions of tons of mineral or agricultural products and millions of m³ of mineral oil/gas for export or import, measurements which are of utmost fiscal and economic importance, if not even the very economic backbone of most of the APEC member economies.

The measurement of our blood pressure gives us precious information on our health situation, the police radar control is for our safety on the road and nations discuss environmental reforms of great economic consequence, based on measurements by instruments monitoring pollution.

It is because measurement in the field of legal metrology has immense economic importance and directly or indirectly affects the daily life of all citizens that it is subject to governmental or official regulatory control.

In most countries in the world you will find *regulatory control* of metrology in all of the following areas:

- trade, (weighing, fluid flow, utility meters etc.);
- measurement in health service (clinical thermometers, blood pressure etc.);
- human safety (speed radar, breath analyser etc.); and
- the measurement of pollution (vehicle exhaust, gas chromatography etc.).

2.2 Technical Barriers to Trade; GATT /WTO Agreements

As part of an emerging global strategy, there is a growing trend for regional harmonisation of technical (metrological) regulations and of mutual recognition arrangements of conformity assessment.

- Recognising the implications of the objectives and the provisions of the GATT and WTO Agreements on Technical Barriers to Trade as well as the rapidly developing APEC programs to create an open market in the region,
- realising that one consequence and benefit of this, in a foreseeable future, will be the elimination of technical barriers to trade,

- realising that governmental and official regulations without exception are real and potential technical barriers to trade unless regionally and internationally harmonised,
- concluding that the implications of this development are of the utmost importance, *particularly in the field of legal metrology*,

as legal metrology because of its regulatory nature, is particularly sensitive to the elimination of technical barriers to trade.

It can only have two possible consequences:

- a) The subsequent elimination of Legal Metrology, or*
- b) The regional/international harmonisation of Legal Metrology.*

2.3 Harmonisation is an Urgent and Cost-Effective Activity

As all APEC member economies share the concern for dependable measurement when economic stability, health, safety and the environment of people are at stake, the first consequence is the less likely, which leaves us with the second consequence which makes the harmonisation of legal metrology *by far the most urgent and important area of metrology*.

- Considering that goods of a value equivalent to between 60% to 80% of the GNP are traded on the basis of measurement by instruments subject to legal metrological control;
- considering that measurement related activities add 4% to the GNP, through the information they provide; and
- considering that 60% of the GNP of the APEC member economies presently is about US \$ 8 trillion;

which probably makes the harmonisation of legal metrology one of the most cost-effective activities, if not *the most cost-effective harmonising activity*, that can be undertaken by the APEC member economies.

2.4 Implications of Harmonisation

2.4.1. Acceptance of conformance certificates.

It is essential to realise that harmonisation of legal metrology not only affects the metrological requirements, the regulations, but also their implementation.

The *Recommendations* in the Report of the APEC 1994 Ad Hoc Task Force on Technical Infrastructure Development provides the basis for a coherent and

systematic approach to enhancing the technical infrastructure and developing this harmonisation. *Recommendation 1* of that Report stated:

“That APEC member economies recognise that, in order to facilitate trade in the regulated sector it is necessary not only to develop their technical infrastructure to a mutually acceptable level, but also to encourage their regulatory agencies to accept conformance certificates from other harmonised APEC economies”.

2.4.2. *The regulatory tools, the metrological regulations.*

The above recommendation speaks about conformance certificates. Conformance with what? *Recommendation 17* of that same Report tells us:

“That APEC member economies support the November 1994 regional conference of Legal Metrology authorities, encourage the conference to work towards harmonisation based on the Recommendations of the International Organisation for Legal Metrology (OIML) and consider the conference recommendations for adoption in their economies”.

It is the provisions of the GATT/WTO Agreements that makes it clear that regional harmonisation must apply as fully as possible, and certainly not be in contradiction with the internationally accepted metrological requirements, ie. the Recommendations of the International Organisation for Legal Metrology (OIML), as contradictions represent technical barriers to trade.

2.4.3. *Conformity assessment.*

The Ad Hoc Task Force in *Recommendation 2* of their Report proposed:

“That APEC serve as the umbrella organisation to promote regional harmonisation of conformity assessment and that it encourage the development of mutual recognition arrangements in the region”.

APEC member economies have thus recognised the importance of the harmonisation of *conformity assessment* in facilitating regional trade and investment.

2.4.4. *Mutual recognition arrangements.*

The development of confidence in the competence of each APEC member economy's technical infrastructure is a prerequisite for the establishment of mutual recognition arrangements for conformity assessment in the region.

The metrological requirements which apply in each of the participants to mutual recognition arrangements, will have to be met by all measurement of goods traded, on the basis of measurement by instruments subject to legal metrology control, as well as by all instruments subject to legal metrology control, whether domestically produced or imported.

Each of the parties to a mutual recognition arrangement on conformity assessment in effect recognise the conformity assessment procedures of the other(s) as being equivalent to its own.

Unconditional acceptance of conformity assessments, test reports and certifications in accordance with mutual recognition arrangements in the regulated sector, ie. Legal Metrology, are likely to demand an especially high level of mutual confidence between participating economies, because of the economical and legal responsibilities placed on regulators.

On the other hand, the mutual recognition arrangements provides significant cost savings by reducing or even eliminating the need for multiple evaluation and assessment.

If the elements of the mutual recognition arrangements, harmonised regulations and conformity assessments are to be effective, they must be underpinned by a technical infrastructure, and cannot be harmonised between the different economies unless the relevant parts of the underpinning technical infrastructure are harmonised first.

These are the reasons why the Report on the APEC Technical Infrastructure Development recognised the urgent need to encourage the enhancement of the technical infrastructure to satisfy the requirement for confidence that might lead to the development of a network of bilateral or sub-regional arrangements which can eventually lead to the development of wider mutual recognition arrangements.

3. ABOUT THIS SURVEY

This Survey is in particular based on the already existing information produced by the Asia-Pacific Legal Metrology Forum viz:

- Directory of Legal Metrology in the Asia-Pacific, March 1995;
- The Survey Report on Legislative Harmonisation, Beijing 22 October 1995;
- The Survey Report on Training, Beijing 22 October 1995,

and supported by a comprehensive selection of documentation on legislation, material resources, etc. The information given in the documents listed above will not be repeated in this Report.

This Survey was not carried out to try and collect more or updated information and documentation on the present resources and status, even if some of the above material may already be considered to be outdated.

On the contrary, this Survey was carried out to try and identify the needs, the present shortcomings of the technical infrastructure in the APEC member economies in question. Particularly in relation to the intentions of harmonisation, to enable the development of the

required level of confidence as the prerequisite for eventual future mutual recognition arrangements.

The identification of these needs was considered necessary by the Second APLMF to enable the development of a realistic program to improve the technical infrastructure within the region by the year 2000.

To enable the identification of these needs the Survey was structured in four main parts of the legal metrology technical infrastructure (Appendix 1):

- legislation;
- administration;
- calibration and test facilities; and
- training.

Because of its regulatory nature, legislation is an important part of the legal metrology technical infrastructure. Legal metrology must be firmly based on the legislative structure of each individual member economy. The Survey sought to identify the needs for firm legislative base for legal metrology in order to meet the implications of the GATT/WTO Agreements on Technical Barriers to Trade.

The administrative tools for the implementation of the regulations are a fundamental part of the legal metrology technical infrastructure, and vital for the establishment of mutual confidence. The Survey sought to identify the shortcomings in the implementation to be remedied so as to achieve the desired confidence.

The material resources of the technical infrastructure, the calibration and test facilities were logically a necessary and important part of the Survey.

Research has established that measurement related activities add 4% to the GNP and that 80% of this added value arises from the skill of the people making and monitoring the measurements. The skill of the staff of the legal metrology bodies, the Regulatory authorities, the Certification and Inspection bodies, not only contribute extensively to this added value, but is equally vital for the establishment of mutual confidence. Training needs was of course an essential fourth part of the Survey.

During the analysis of the collected data, a deliberate effort has been exercised to avoid drowning in detail and to concentrate on findings of general and regional character that might trigger cost-effective initiatives. In reporting, the findings and needs of general and common regional nature are considered essential, reference to the individual APEC member economies are usually restricted to cases where it might be of particular interest.

4. ECONOMIC AND SOCIAL BENEFITS OF LEGAL METROLOGY

In most of the APEC member economies visited, there is a significant need for both capital expenditure on the purchase of equipment and the establishment of facilities as well as a commitment towards the training of all levels of staff.

However, between the individual APEC member economies there are different needs and priorities, much depending on the base of their economy, whether it is basically trading of raw material and agricultural products, or a more developed and complex economy.

Recommendation 6 of the report of the 1994 Ad Hoc Task Force proposed:

"Funding support should be provided primarily by the individual APEC members for their own infrastructure, with the recognition that developing economies would benefit from additional financial support from developed economies in this area."

4.1 Findings

One of the most interesting and informative discussion topics of the Survey was the following: *Does your government recognise the economic benefits of legal metrology?*

Only in the People's Republic of China was the immediate answer "not enough". In most of the other APEC member economies the immediate answer was surprisingly relatively confirmative. Not so that they could not wish for a more generous budget, there were many obvious needs. But they all had a budget, increasing every year.

During the discussions however, it soon became evident that even if the legal metrology authorities, to a certain degree, recognised the economic benefits of metrology, the budget decision makers are far from recognising it. In no single case was the yearly increase of budget for legal metrology of the same rate as the yearly rate of growth of GNP of the respective economy. Usually, far from it.

This signifies not only that at present there is clear negative development of the funding of legal metrology in the APEC member economies if compared to a traditional, non-ambitious situation. Compared with the ambitions of *Recommendation 6* above, and with other statements relating to the importance and urgency of amending and developing the technical infrastructure to a mutually acceptable level, it becomes evident that the development of funding for the legal metrology technical infrastructure is falling behind the growth of the economies and may eventually create barriers to growth.

4.2 Need

To change the present situation, the communication with the decision makers needs to be improved. A strategy must be worked out to establish the economic benefits of legal metrology in such a way as to arrive at real recognition by the decision makers.

It is clear that the very highest priority must be given to *motivate* the decision makers in the individual APEC member economies to provide an adequate level of funding to ensure the relevant and efficient development in the field of legal metrology technical infrastructure.

Two proposals were suggested at different stages of the Survey, and in both cases there was general, even enthusiastic support.

- Recommendation 1 - A Seminar, preferably in association with an APLMF meeting, on the economic and social benefits of legal metrology.
- Recommendation 2 - An audio-visual presentation of case studies of economic and social benefits.

The very point of the proposed Seminar is that the lecturers, giving examples, documented statements, case studies of economic benefits of legal metrology, must *all* be non-metrologist, decision makers from government and big economic actors in the private sector. Many Seminars have been arranged where metrologists describe the benefits of metrology to an audience of non metrologist. They have all been in vain. If anything is to be achieved, it is by non metrologist decision maker who is aware of the economic importance of competence and accuracy in measurement, who must convince other non metrologist decision makers, who speak the same non metrologist "language", about the economic benefits of legal metrology.

Seminar themes such as:

- Evaluation of fiscal importance of accurate measurement of fluid flow measurement;
- Evaluation of economic importance of modern and accurate measurement by legal metrology of minerals for export;
- Similar about agricultural produce for export; and
- The importance in the health service of dosimeter control by legal metrology.

It will take some effort to arrange a Seminar like this, but the efforts should not be overestimated. Both in the People's Republic of China and Chinese Taipei they quickly had potential lecturers in mind, and in many of the other member economies they expressed optimism in this respect.

The papers of the seminar should then be extensively exploited in the further communication with the decision makers in each member economy.

An audio-visual presentation is usually a very efficient introductory way of opening communication channels, and can easily be combined or followed up with written statements.

The audio-visual presentation should of course be based on case studies of direct relevance in the APEC member economies. There are lots of good examples to draw from, such as replacing the sale of iron ore based on the draft of a boat by an automatic belt weigher; by replacing outdated measurement of crude oil by modern measurement etc.

Again, it will take some effort as well as some funding to produce an audio-visual presentation, but the general opinion throughout the discussions was that an audio-visual presentation might become a very important communication opener to the decision makers

and be an effective tool to provide more adequate funding for the legal metrology technical infrastructure.

5. LEGISLATION

5.1 General Findings

By far the most important legislative development in the APEC developing member economies is that the legislation of all economies, with the exception of the People's Republic of China and Mexico, at present is at different stages of revision.

The revisions are in general motivated by the need to modernise the legislation to meet the requirements of the technical and to a certain degree the political/economic developments. In each individual economy the revisions in general reflect the need to meet internal demands, including interesting developments of the legal metrology services, reorganisation of responsibilities, in some cases opening up, perhaps somewhat cautiously for privatisation, in addition to enable legal metrology to deal with the technical development of modern instrumentation and measurement methods. In principle however, in most cases the revisions are extrapolations of the old legislation.

On the other hand, very little concern seems to have been given to allow for international harmonisation, to meet the implications of the GATT/WTO Agreements on Technical Barriers to Trade, to allow for the changes and enhancements of the legal metrology technical infrastructure needed to withstand the strain and challenges of a possible future free market situation based on mutual recognition agreement of conformity assessment.

On the contrary, in some cases the view of the legislation as having protectionist functions was held, a view that may well have had its merits during stages of the political/economic development, but which hardly is consistent with present days international agreements.

This was the impression left after the discussions with legal metrology regulating authorities and enforcement agencies, some of whom were possibly not very well informed either about the 1994 Report on the APEC technical infrastructure development, the SCSC technical infrastructure development survey, the Report of the Second APLMF, or the implications of the GATT/WTO TBT Agreements.

There is an major lack of appreciation of what kind and level of development of the technical infrastructure the mutual recognition agreement actually requires.

5.2 Need

The obvious as well as urgent need arising from this fact is that in the current legislative revisions, immediate concern must be given, in so far that it has not already been given, to the implications of the GATT/WTO TBT Agreements, and the need for the legislation to provide for the development of mutual recognition agreement of conformity assessment.

This is urgent because several of the revisions are very close to being finalised. It is also a splendid opportunity, now before the revisions are finalised, to assure that the harmonised APEC legal metrology legislation will be the most modern and powerful.

After comprehensive discussions two proposals were suggested to address this concern.

Both proposals were generally strongly supported.

Recommendation 3 - As a matter of priority, a meeting of the APLMF Working Party on "model Law". (Ref. Report of Second APLMF, agenda items 4.2 and 12.9.2).

Recommendation 4 - As a matter of priority, a meeting of the APLMF Working Party on mutual recognition agreement. (Ref. Report of Second APLMF, agenda items 8 and 12.9.8).

The Working Party on "model Law" should concentrate exclusively on the identification of realistic "minimum requirements" to be met by a legal metrology legislation to allow for the implementation of the GATT/WTO TBT Agreements and for the development of mutual recognition agreement of conformity assessment.

It was generally appreciated that the intended close collaboration with OIML should be observed, but that the identification of "minimum requirements" is far too urgent for the APEC member economies to allow it to be delayed by the longer term schedule of the OIML involvement. On the contrary, this could be an area where the APLMF member economies might bring an important and timely contribution to global harmonisation.

The Working Party should have contributors from all of the APEC member economies involved and should be convened twice. The first meeting should benefit from being opened by a day's (or half a day) seminar on the consequences of TBT Agreements in the field of legal metrology, to extend the knowledge of the participating metrologists to all relevant matters.

The deliberations of the first meeting should be based on a comprehensive draft document prepared by the APLMF Secretariat. This document and the seminar will obviously require funding. The first meeting should conclude with a harmonised understanding of what the "minimum requirements" are, thus enabling the participants to study, between the two meetings, their respective Law revisions and in particular to identify the possible obstacles for regional harmonisation. Before the second meeting, feedback from the deliberations of the Working Party on mutual recognition agreement should be received and included in the discussions of the meeting.

The Working Party should conclude with the endorsement of an advisory document or guide on minimum requirements for modern harmonised legal metrology legislation to satisfy the requirements of TBT Agreements and allowing for the development of mutual recognition agreement.

For the Working Party on "model Law" to be able to identify minimum requirements to be met by the legislation to allow for the development of mutual recognition agreement of

conformity assessment, it will be necessary to identify the principle requirements of mutual recognition agreements for legal metrology.

To this end, the second Working Party should be set up, focusing on the identification of the principle requirements of mutual recognition agreement. Even if the long term objectives of this Working Party may be to develop the framework for mutual recognition agreement, the urgent primary short term objective must be to study and identify the principals, the basic practical impacts and requirements of mutual recognition agreements, and their impact on the legal metrology technical infrastructure. This is:

- to ensure that relevant feedback may be given in time to the Working Party on "model Law", to meet the deadlines of the current Law revisions; and
- to clarify as quickly as possible to all parties involved the comprehensive impact that different levels of mutual recognition agreements will have on the technical infrastructure.

It is important to appreciate that it is presently premature to enter into any discussions on the establishment of mutual recognition agreement as such.

Since the primary aim of the second Working Party is to give feedback to the first Working Party, it might seem like duplication of work to organise two Working Parties. However, if the intended schedule of appropriate initiatives to be achieved by the year 2000 is going to be met, it is vital that the two Working Parties work in parallel. Besides, the second short term objective of the Working Party on mutual recognition agreement, the "impact", is a much needed prerequisite to enable a rational and cost-effective development of the technical infrastructure.

The Working Party on mutual recognition agreement should also have contributors from all of the APEC member economies involved and should be convened at least twice. It might also benefit by being opened by a seminar of relevant information, which will speed up the deliberations and make them more to the point.

The first meeting should be based on a comprehensive draft document prepared by the APLMF Secretariat. This document and the seminar will obviously require funding. The first meeting should conclude with a harmonised understanding of the implications of mutual recognition agreement and a relevant feedback to the other Working Party.

By the second meeting the relevant development needs of the respective member economies should emerge, and the Working Party might wish to continue to work out a guideline on what mutual recognition agreement requires of a legal metrology technical infrastructure.

5.3 Other Findings

In a little more detail about the Law revisions:

The People's Republic of China is not revising the Law, but will add minor adjustments concerning pre-packaging and wholesale transactions for commodities. Mexico has a new Law of 1992 and has no plans of revisions.

In the remaining APEC member economies, major revisions are currently taking place. The Republic of Korea, who also has a new Law of 1992, is working on comprehensive amendments and revisions of the Regulations, essential component of the legislative system. The others are dealing directly with revisions of the Law, but they are all at different stages, from Thailand where the revision is nearly finalised and possibly already passed to the Parliament, to the Philippines which is working on consolidation of legal metrology Laws and Papua New Guinea which is looking into completion/ consolidation of the legal metrology legislation.

Pattern or type approval requirements are important components of the legislation. It is also a sensitive area of TBT as it is automatically considered technical barriers to trade unless regionally/internationally harmonised. In two member economies there is no pattern or type approval requirements at present, but the Law revisions will change that. In all of the other member economies there are requirements both for trade measuring instruments and for certain utility meters. But of various degrees, levels and implementation.

In the People's Republic of China, requirements of pattern approval extends to more than 50 different types of instruments, in Chinese Taipei only small electronic scales and two types of utility meters need pattern approval. In Papua New Guinea pattern approval is presently not implemented, in Mexico it is only implemented if an accredited laboratory is available to conduct the tests.

Need: Regional harmonisation of pattern or type approval is an area requiring very close attention by the two Working Parties on legislation and mutual recognition agreement.

Privatisation and various forms of delegation of work was part of the discussions. With a few important exceptions, present legislation does not in general allow for pattern or type approval testing by private laboratories nor instrument verifications by private organisations or the accreditation of private verifiers.

Present Laws do not generally accept overseas test results, and never unconditionally. With one exception there is no way of accepting auditing of production of instruments to ensure conformity with pattern. With one important exception, batch or sample testing is hardly dealt with in present legislation. Present legislation in most member economies includes the metrological control of special legal metrology instruments such as police traffic instruments, environmental monitors and certain medical instruments, but this area is usually characterised by multiple administrative authorities.

Need: All of these areas require very close attention by the two Working Parties on legislation and mutual recognition agreement if an adequate level of confidence of conformity assessment is going to be achieved to support regional harmonisation.

6. ADMINISTRATION

6.1 Findings

There are three main areas of important current administrative reform in most of the technical infrastructure of the member economies. One concerns comprehensive reorganisations of the legal metrology technical infrastructure, actually planned in Thailand, envisaged for Malaysia and wanted in Mexico. The other deals with initiatives to co-ordinate the administrative infrastructure, mainly to cope with the present situation of multiple authorities. The third relates to funding.

In all member economies legal metrology is administered by multiple authorities, but there are various degrees of this multiplicity, and various degrees of how this is looked upon, depending on how narrow the local definition of legal metrology is. In a few cases police radar, for example, may not immediately be regarded as relevant to legal metrology, although it clearly is an instrument and measurement method subject to official control.

Another, related co-ordination concern results from the fact that in many member economies, the regulatory and the enforcement authorities are administratively separate units. There were clear indications that the legal metrology would benefit from enhanced co-ordination.

There is a growing awareness that regional harmonisation requires a degree of national co-ordination of the legal metrology administrative infrastructure, but there may be little appreciation that future privatisation, most likely to be developed by revised legislation in many member economies, as well as possible deregulation, will introduce many new actors in the field of legal metrology and will dramatically increase the demand for an organised harmonisation and co-ordination.

There seemed to be some lack of experience in how to deal with co-ordination, which often is of sensitive nature. The findings indicate that in most cases there is established various consultative mechanisms between the governmental regulators of legal metrology, but in no case were the mechanisms considered completely satisfactory. This shortcoming may become more important as the authorities dealing with classical legal metrology move towards higher levels of regional harmonisation.

The findings also indicate that various consultative mechanisms exist with industry, but hardly to the extent required by modern legal metrology. There seems to be a general lack of appreciation of how modern legal metrology should underpin the development and maintenance of quality of industrial production and contribute efficiently to its competitiveness.

The legal metrology activities certainly do not adequately reflect the demands of the current explosive development of ISO 9000 certification activities. In very few cases has any member economy conducted any survey on the needs for legal metrology services in the country. The consultative mechanisms need to be strengthened and legal metrology needs to keep an open attitude to the demands of modern society.

As for the funding of legal metrology, it was in no case considered possible to increase the level of cost recovery to fund development of the legal metrology technical infrastructure. Mainly because the member economies did not have a cost recovery policy. There was one exception to this, as one member economy mentioned the possibility to achieve cost recovery by privatisation of certain services, intended by the current Law revisions.

This is a question that needs serious attention and fundamental changes, ref. the requirement of *Recommendation 6* of the 1994 APEC Technical Infrastructure Survey, "Funding support should be provided primarily by the individual APEC members for their own infrastructure".

6.2 Need

Three areas of urgent need for appropriate initiatives arises.

One deals with expert help and advice in the creation of an adequate and relevant technical infrastructure, the other about experienced help and encouragement in the task of co-ordination of the administrative infrastructure and the third with an active process to change the attitude to cost recovery policy.

To address these concerns a number of proposals were suggested and examined.

The conclusions drawn from the survey to this end are as follows:

- Recommendation 5 - A project on a "model" technical administrative infrastructure.
- Recommendation 6 - Seminars and other dissemination of information to encourage co-ordination.
- Recommendation 7 - An APLMF Working Party to examine the principles and possibilities of increasing legal metrology funding sources.

The model technical administrative infrastructure project.

For some years now, a plan has been developed to establish a national legal metrology technical administrative infrastructure in Thailand. This well defined plan includes the establishment of four provincial legal metrology head quarters, linked to the existing national HQ. The country will be subdivided in five legal metrology areas, one for each of the HQ's who would be responsible for the enforcement activities of the inspectors or legal metrology officers.

In other words, a classical infrastructure situation. The office and laboratory buildings of one of the provincial HQ's are finished, another one will be finished this year, another one in 1998 and the last one in 2000. The existing national HQ will be the responsible regulatory authority for the administration of this national legal metrology infrastructure.

Thailand has the plan, but because of lack of experience, they need expert advice on the implementation. An expert project must analyse the real needs, at the national as well as at

the local level, suggest the relevant and adequate equipment, and must advise on efficient administrative structures including modern quality requirements etc.

Thailand has secured the budgets for the HQ buildings, as well as the plans and land for their construction, and it is claimed that the financing of the equipment is cleared with the ministries, this project clearly satisfies the requirements of Recommendation 6. It is thus a cost-effective project, particularly since it can be done so that the result will be useful for other economies in the similar situation, such as Malaysia who is just starting the planning of a similar development, and for several others.

It will be a sizeable project, but should be confined to between 6 and 12 months of expert assistance, distributed over perhaps 3 to 5 years. A longer period for the initial analysis and evaluation of the situation, followed up with shorter supervision periods to monitor and advise on the progress.

Seminars etc. to encourage co-ordination.

There was a strong support to the idea that co-ordination with industry and other regulatory bodies could be significantly improved by communicating through well organised seminars. These are in principle, activities that must be initiated by the individual member economy, but it was felt that APLMF should play a major role in collecting and organising the material to be presented at such seminars. The Seminar as well as the audio-visual presentation, previously mentioned should represent important material for inclusion.

The APLMF Working Party to examine the principles and possibilities of additional sources of national legal metrology funding

If any positive development of the technical infrastructure is going to happen at all in the member economies, it is essential that the member economies get together to discuss and examine with an open mind, the possibilities of additional funding sources on the national level, such as revision of fee policy etc.

The deliberations of this Working Party should be co-ordinated in time with the development of the Seminar and the audio-visual presentation, and the findings should be given a structure for efficient communication with the decision makers at the national level.

It is proposed that APLMF urgently create a Working Party for this purpose, preferably reporting soon enough to meet deadlines of Law revisions.

7. CALIBRATION AND TEST FACILITIES

7.1 Findings

There are four main areas of concern in the field of calibration and test facilities.

One relates to the general shortage of modern and comprehensive equipment for the enforcement, mainly at the inspector level, and particularly for the verification of instruments of high capacity, both for the measurement of mass and fluid.

This is a shortcoming that will seriously affect the efforts to establish mutual confidence, the prerequisite to mutual recognition agreement. It cannot be efficiently dealt with until the member economies are willing to substantially improve the funding support for legal metrology technical infrastructure. It is another reason to produce evidence of the economic importance of legal metrology for presentation to decision makers, ie. such as the Seminar and the audio-visual presentations.

Secondly, there are quite serious breaks in traceability chains, mainly between the inspector level and the national level, with a shortage of intermediate links. This is a serious concern, considering the mutual recognition agreement dependency on confidence. This is of course a problem of funding, but it is basically a problem of quality control.

The fastest and only systematic program to improve the situation is for the previously mentioned Working Party on mutual recognition agreement to define accreditation to ISO Guide 25 and 58 as a mandatory requirement for mutual recognition agreement, at all levels of enforcement, pattern approval as well as inspection, verification, certification and other conformity assessment. In addition, the national legal metrology bodies should support and encourage the development of efficient national accreditation bodies and their regional cooperation.

Thirdly, for the more developed member economies, there is a characteristic need for facilities for high technology metrology control, such as environmental monitoring, medical instrumentation, ems, etc.

An improvement to this situation is mainly dependent of the success in attempts to generate additional funding at a national level..

The fourth main area of concern is related to the idea that the enforcement of pattern approval would be greatly extended by the revised Laws. This would highlight the quite serious shortcomings in the present situation where the facilities for pattern approval testing are limited in many economies.

The Second APLMF meeting decided to conduct a survey on specialist legal metrology testing facilities in the region and accessibility to these facilities by Forum members. The discussion on this matter led to various strongly supported proposals to encourage this survey in the direction of seeking to identify possibilities of regional division of pattern approval activities, but at the same time maintaining an appropriate level of "local" competence.

More detailed needs were also identified by the Survey, such as a need for Thailand to establish a working measurement standard for the verification of field humidity meters for grain and rice. This would be a measurement standard of very great importance in the region, where agricultural produce is the base of the public and individual economy.

And for several economies, a need to develop a harmonised method for the verification of electronic blood pressure meters. These instruments are in the forefront of the interest in medical instrumentation, and have an important diagnostic significance. This is a case where attention should be focused on the work in the relevant Technical Committee of OIML, to ensure that any regionally harmonised method is in line conformity with the internationally harmonised method.

As for the vertical traceability at the top of the national hierarchy and from the national to the international level, the situation is relatively satisfactory, with quite extensive activities currently in progress.

7.2 Need

In consequence, two projects for separate action are identified in the area of calibration and test facilities. In both cases there was strong support as well as wish for participation and to take advantage of the results. Both projects are typical R&D-projects, and might be of interest to some of the many very competent R&D institutes in the region.

- Recommendation 8 - A R&D project to develop a working measurement standard for the verification of field humidity meters for grain and rice.
- Recommendation 9 - A project to develop a harmonised method for the verification of electronic blood pressure meters. A project as proposed by Chinese Taipei is annexed in Appendix 2.

8. TRAINING

8.1 Findings

The training needs of the People's Republic of China were not considered by this Survey, as it is the object of a China-Australia bilateral project.

Training needs was the high priority need of legal metrology authorities with the exception of Mexico, where the turnover of people in the enforcing agency, PROFECO, was said to be so high (people did not last more than 6 -12 months), that training would be ineffective.

In all other member economies, training is needed at two levels. One is the need for general legal metrology training, the other is the need for special training in the pattern approval and verification of modern electronic instruments or in the verification methods of automatic, high capacity instruments for quantifying mass or fluid.

There are promising developments also in this field; the Indonesian Metrology Training Centre is seeking to modernise its curriculum and is currently training 150 students yearly. Korea has currently secured partial funding for a new Metrology Academy and Malaysia is planning to establish a regional Metrology Training Institute. Even so, the task is immense. Raising the general level of training of regional inspectors, means giving about 4,000 inspectors (excluding China) in the region, speaking different languages, having different levels of training at the start, half a year to one year of training. Before the year 2000!

One way to achieve anything of the sort would be massive dissemination of the Australian National TAFE Correspondence Certificate Course for Trade Measurement Inspectors, possibly in conjunction with some organised brief in situ practical training. This is however such a massive undertaking, with significant language barriers, that it is doubtful whether it can be considered an initiative that can be realistically achieved by the year 2000.

It is important for the future development of mutual confidence, to realise that only in a couple of member economies does the present training include OIML pattern approval requirements, and in no member economies is training considered adequate for current electronic technologies. The training currently available is usually restricted to courses of a few days duration, and on-the-job training. It is difficult to see how regional harmonisation may quickly become effective on the basis of on-the-job training. To do something about it will require the preparation of complete training modules for the verification and pattern approval in accordance with OIML requirements.

There is particular need for specific short-term training in the internationally harmonised testing of modern non-automatic weighing machines, perhaps the most common legal metrology instrument and in the development of a training course module.

Many member economies base much of their national economy on the export of raw material, minerals, agricultural produce, crude or refined mineral oil. Quantification of this is by technically complicated high capacity trade instruments. Very great values are traded in all APEC member economies, by quantification through fluid flowmeters and large automatic weighing machines. It is found, however, that training in this field is practically non-existent and the need for training is pressing.

It appears to be more difficult to obtain funding for training than for any other investment in legal metrology.

Involvement in technical committees is usually considered to have a technical transfer value, however involvement in OIML Technical Committees is very limited in most member economies due to lack of travel funds and appropriate expertise.

There is limited awareness of the training value of participation and that most OIML technical work is based on correspondence and not on expensive travelling and meetings. If APEC authorities have experts to utilise OIML Recommendations, they have the expertise to participate in the elaboration of the same. The trend towards regional harmonisation means a need for greater involvement in the international harmonisation.

In connection with the discussions about advantages in using Internet to link up Forum members to facilitate communication, a proposal came up to use Internet to link up Forum members to OIML activities. In practical terms, the proposal is that the APLMF Secretariat establishes OIML pages on Internet, where the APLMF members who are active as participants or secretariat of any OIML Technical Committee will load into the pages the current TC development, enabling other APLMF members to participate in an internal APLMF discussion and follow-up of the information.

This idea was strongly supported, as was the idea to use E-mail or Internet to link up Forum members, including information on Pattern Approval Certificates.

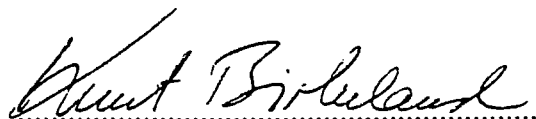
8.2 Need

As a consequence, two Internet initiatives and four training projects are proposed. They are all strongly supported and considered to be appropriate initiatives that can be realistically achieved on a short term basis.

- Recommendation 10 - The APLMF Secretariat establishes OIML pages on Internet to enable APLMF members to follow the current development of draft OIML Recommendations.
- Recommendation 11 - The APLMF Secretariat establishes the facilities to link up Forum members to facilitate communication including Pattern Approval Certificates.
- Recommendation 12 - A seminar/workshop be organised on fluid flow measurement of high capacity.
- Recommendation 13 - A seminar/workshop be organised on automatic weighing instruments of high capacity.
- Recommendation 14 - A project "training for trainers", focused for the implementation of OIML R76 for the testing of non-automatic weighing instruments.
- Recommendation 15 - A training project on the development of a "training course module" on the verification of specific legal metrology instruments in accordance with OIML criteria.

For specific information on the two training projects in Recommendations 14 and 15, refer to Appendix 3. The two projects are proposed and described by the Malaysian member/participant, and it is the feeling that the Survey should be concluded by this direct contribution from the APLMF member.

Oslo, May 1996



Knut Birkeland

SURVEY OF LEGAL METROLOGY TECHNICAL INFRASTRUCTURE NEEDS IN ASIA-PACIFIC DEVELOPING ECONOMIES - DISCUSSION TOPICS

The Directory of Legal Metrology in the Asia-Pacific has provided a useful description of the national measurement systems in Forum member economies. Within the member economies there is a wide variation in the development of the national measurement systems with some members still to establish a legal metrology system.

Effective harmonisation of technical requirements leading to mutual recognition agreements in the region will require all members to have the capability to ensure conformity of measurements used in trade in the region and compliance of legal measuring instruments with agreed requirements.

The APEC Standards and Conformance Sub Committee (SCSC) has considered technical infrastructure development in the context of a medium and long term action plan and has proposed the development in 1996 of a program to improve technical infrastructure by the year 2000. This program will take into account the different levels of economic development of APEC members. The program may include:

- harmonisation of standards and technical requirements;
- improved calibration and testing facilities;
- training of personnel.

The SCSC supports the development of technical infrastructure through technical assistance where needed and there has been some discussion within APEC on establishing a source of funds for technical infrastructure development.

The Secretariat has been successful in obtaining funding for a consultant to conduct the above technical infrastructure survey in the following nine economies:

People's Republic of China, Indonesia, Republic of Korea, Malaysia, Mexico, Papua New Guinea, Philippines, Chinese Taipei and Thailand.

The consultant is Dr Knut Birkeland, who has recently retired as Director General of the Norwegian National Metrology Service. Dr Birkeland was also President of the International Organisation of Legal Metrology from 1980-1994. He has a unique insight into the development of legal metrology and through the OIML Development Council, the needs of developing economies. The attached 1992 article by Dr Birkeland on "Legal Metrology Facing the Future" provides some of his views on the expanding scope of legal metrology.

The survey will focus particularly on the following:

- legislation and administration; calibration and testing; and
- training

relating to:

- trade measurement;
- utility meters (i.e. gas, water, electricity, telephone, taximeters);
- other legal measuring instruments (e.g. environmental monitors, police traffic measurements, medical measuring instruments, health and safety measurements).

Two other specific topics will also be discussed:

- the possibility of using the Internet and E-mail to link up members of the Forum in order to facilitate communication among members; and
- the extent of accreditation of testing facilities and resources required to obtain full accreditation.

This survey will consider the technical infrastructure needs of Asia-Pacific developing economies. It will be complemented by a further survey on specialised legal metrology, calibration and testing facilities in the region.

Whilst the survey will concentrate on the technical infrastructure needs of the government legal metrology authority in each economy, we will also be interested in identifying technical infrastructure needs in the broader legal metrology system (e.g. other government regulatory authorities, private test and calibration facilities).

The attached survey sheets are provided as a guide to the discussion with Dr Birkeland. For each topic we would like you to identify your principal needs and provide a written statement of these to Dr Birkeland. This can then be supplemented by points arising out of the discussion.

As Dr Birkeland has a limited time in each economy we would request that you prepare a program of discussions that focuses on all aspects of legal metrology but not on other aspects of the national metrology system that are the responsibility of other Specialist Regional Bodies (e.g. APMP, APLAC).

LEGISLATION

- What are the principal legal metrology legislative developments needed in your system?

Discussion Topics:

Does your present legislation provide for:

- pattern approval of trade measuring instruments;
 - pattern approval testing by private laboratories;
 - acceptance of overseas test results for pattern approval;
 - auditing of production instruments to ensure conformity with pattern; verification of instruments by private organisations;
 - accreditation of private verifiers;
 - batch or sample testing of instruments and products to ensure conformity with requirements;
 - pattern approval, verification and reverification of utility meters (electricity, gas, water etc.);
 - metrological control of specified legal measuring instruments e.g. police traffic instruments, environmental monitors, medical instruments.
- Has your government given consideration to consolidating all national metrological requirements in a single piece of national legislation?
 - The Beijing Forum Meeting recommended that the Forum in cooperation with OIML develop model legal metrology legislation. Would this be useful for your national system?
 - Is your measurement legislation available in English? If not do you see value in translation into English?

ADMINISTRATION

- What are the principal needs in the development of the administration of your economy's legal metrology system?

Discussion Topics:

- Is legal metrology administered by a single or multiple authorities?
- Can the level of cost recovery be increased to fund development of the system?
- What is your government's policy on the privatization of some aspects of legal metrology?
- What consultative mechanisms are established between your organisation and other government regulators?
- What consultative mechanisms exist with industry?
- Has your organisation conducted any survey on the needs of legal metrology in your economy;
- Does your government recognise the economic benefits of legal metrology?

CALIBRATION AND TEST FACILITIES

- What are the principal needs in your system for calibration and test facilities for legal metrology?

Discussion Topics:

- Is there a well-established traceability chain for all legal measurements?
- Is there direct traceability from your organisation to the national primary standards laboratory?
- Is there traceability from your organisation to standards of other national and international organisations?
- Do you have a full range of inspectors' standards for the verification and reverification of instruments in the field?
- What are the principal needs for test facilities for pattern approval?
- Are your calibration and test facilities accredited?

TRAINING

- What are the principal needs for training in legal metrology in your economy?

Discussion Topics:

- Does present training include OIML pattern approval requirements?
- Is staff training adequate for current electronic technologies?
- What national organisations currently provide training in metrology and what is your contact with them?
- Have any staff been trained overseas in legal metrology?
- What difficulties are encountered in obtaining funding for overseas training?
- Have experts from overseas worked in your organisation to provide on-the-job training?
- What resources exist in your organisation for maintaining and developing staff skills?
- Are any of your staff involved in technical/standards committees?
- What impediments exist to extending your involvement in OIML, particularly its technical committees?
- What needs are there in your economy for training for legal measuring instruments other than trade measurement?
- Do you see advantages in using E-mail or Internet to link up Forum members to facilitate communication?
- Information on Internet could include Pattern Approval Certificates.

PROJECT PROPOSAL BY CHINESE TAIPEI

SUBJECT: Pattern approval and verification of non-invasive electronic sphygmomanometers.

ARGUMENT:

1. Sphygmomanometers (instruments for measuring blood pressure) are widely used for human medical care. Currently, there are two main types, namely mercury-in-glass sphygmomanometers and electronic ones. The metrological control of mercury-in-glass sphygmomanometers has been a common practice worldwide.
2. In contrast, the metrological control on electronic sphygmomanometers is limited to a few economies. The existing applicable verification methods, including AAMI SP 10-1992/ANSI, JJG 692-90/CHINA and Japanese regulations of verification for specified measuring instruments are used domestically. There are currently no international or regional metrological requirements and test methods in this aspect.
3. Growing regional market of the electronic sphygmomanometers and awareness of the need for real confidence in measurement result have demanded the legal metrology authorities to study the harmonisation of the pattern approval and verification of these instruments.

PROPOSAL:

Recognising the importance of electronic sphygmomanometers to human medication and to trade liberalisation, and to increase involvement of APLMF members, we propose to form a working group to study the possibilities of harmonisation of pattern approval and verification of electronic sphygmomanometers.

PROPOSAL FOR TRAINING BY MALAYSIA

1. TRAINING NEEDS

Training in the various disciplines of legal metrology has been identified as a pressing need by many of the Asia-Pacific economies during the discussions with Dr. Birkeland on 11-12 March, 1996 in Malaysia. The need stretches from training inspectors in basic verification skills to training metrologists in specific disciplines. This scope of training is however too wide and not cost effective to be implemented in full. In view of this the training needs have to be narrowed down to particular areas of priority. Two areas of priority in the region have been noticed. The first is the training of trainers who would in turn become the core personnel to train other inspectors and the second is the preparation of a complete training module for the verification and pattern evaluation testing of specific instruments in accordance with OIML criteria.

It is felt that the implementation of these two training programs will help towards achieving the following:

- (i) increase in the pool of core personnel for training in legal metrology,
- (ii) the training scheme adopted in the area would be uniform,
- (iii) methods of verification and procedures adopted would be standardized,
- (iv) training modules for specific instrument could be developed,
- (v) the capabilities and capacities of legal metrology organisations in the area would be enhanced,
- (vi) establish transparency and competency of measurement in the area and,
- (vii) establish confidence in inter- and intra- regional trade transactions.

2. PROJECT PROPOSALS

Two proposals for the consideration of APLMF are outlined below. The first proposal is for training trainers of Inspectors of Weights & Measures in the implementation of OIML R76, while the second proposal is for the preparation of a complete training module for the verification and pattern evaluation testing of specific instruments in accordance with OIML criteria. The two proposals underpin the fact that individual training for Inspectors should be the responsibility of the respective economies.

2.1 Training for Trainers

It is proposed that the training be confined to the implementation of OIML R76 for the testing of non-automatic weighing instruments. This OIML document is chosen because non-automatic weighing instruments form the largest group of instruments encountered in legal metrology enforcement in the Asia-Pacific region. The training period should be for three weeks so that other related subjects can be included to emphasize the necessity to achieve greater competency in measurement. Such related subjects are: uncertainty of measurement, good laboratory practices and principles of construction of electronic weighing instruments. The training could be conducted at a Technical Training Institute in one of the developing economies in the region which is implementing OIML R76 fully. Alternatively it could be an economy with a good infrastructure in Legal Metrology.

As this course is aimed at training trainers suitable resource personnel should be sourced from within and without the region. For this purpose specialists with practical and teaching experience in legal verification and pattern evaluation of non-automatic weighing instruments should be sought.

Participants should be restricted to 20 persons for the training to be effective. There should be strict criteria set for the selection of participants so that only participants involved in training and who have good practical experience and a fair knowledge of legislation will be selected.

2.2 Training Course Module

It is proposed that some developed economies within APLMF be given the task to develop a complete training course module on the verification of specific legal metrology instruments in accordance with OIML criteria. The complete training module should include the complete technical facility set up, course material (in the form procedure manuals preferably in CD ROM), duration of the course and a final written and practical examination to be conducted to assess the extent of understanding of the participants.

