Report on the Workshop

Proficiency Testing for Water Testing Laboratories

Windhoek, Namibia, February, 23 - 27, 2004

Prepared by Dr.-Ing. Michael Koch

Participants

The workshop was attended by 35 participants from the following countries:

- Angola 1
- Botswana 2
- Ethiopia 1
- Lesotho 2
- Kenya 2
- Malawi 2
- Mauritius 2
- Mozambique 2
- Seychelles 2
- South Africa 1
- Swaziland 2
- Tanzania 2
- Uganda 2
- Zambia 1
- Zimbabwe 2
- Namibia 9

The workshop was leaded by

Dr. Mukayi Musarurwa, CSIR, South Africa
Dr. Michael Koch, Universität Stuttgart, Germany
Dr. Kai Stoll-Malke, PTB, Germany

Additional presentations were given by

Dr. Hans Klinge, BGR, Germany
Mr. Neville Tayler, SANAS, South Africa

A complete list of participants is given in Annex 1, a group photograph is included in Annex 2.

Workshop-Programme

The final version of the workshop-programme is enclosed in Annex 3.

Monday, 23rd February 2004

Opening

The Workshop was opened by the following officials:

- Dr. Musarurwa, SADCMET regional coordinator, Pretoria
- Mathew Shilongo, Mayor of the City of Windhoek
- Dr. Massing, German ambassador to Namibia (Annex 4)
- Hon. Bernard Esau, Deputy Minister of Trade and Industry, Namibia (Annex 5)

Reporter from Namibian print media (also in German language) as well as from radio and television were also present.
There was a report about this opening in the Namibian Broadcasting (NBC) News in the evening (about 5 minutes).
The German project coordinator Dr. Kai Stoll-Malke (PTB) gave an interview to the German radio station.

Introduction of speakers and participants

After a short introduction for all participants (name, institution and country) Dr. Musarurwa introduced into the activities of SADCMET and into the objectives and aims of the workshop.
Dr. Stoll-Malke introduced the activities of the PTB and why this workshop was supported by the German Ministry of Economic Cooperation and Development (Annex 6).
Dr. Koch introduced himself and his experience as PT provider in Germany within the Institute of Sanitary Engineering, Water Quality and Solid Waste Management (Annex 7).

Participants presentations

Before the workshop the participants were asked to give a short presentation at the workshop about their work and the status of their laboratory regarding accreditation, participation in PTs and traceability. The participants presented in alphabetical order of their country. The content of the presentations is described here only in a few notes:

- **Botswana**
  - Mr. Ogopotse Motsewabathata – Dept. of geological survey (Annex 8)
    - Analysed parameters/methods: AAS, CO_3^{2-}, HCO_3^-, IC, ICP-OES
    - Samples from peri-urban and rural
    - PTs of Botswana Bureau of Standards (BOBS) and South African Bureau of Standards (SABS)
    - Not accredited
  - Mr. Meshack Balebetse - Water Utilities Corporation (Water Supplier – Water Quality Lab) (Annex 9)
    - Analysed parameters/methods: IC, AAS, GF-AAS, Autotitrators, HPLC
    - Waters from dams
    - Chemical, microbiological (Coli) and biological (algae) testing
    - PT by internal sample exchange and BOBS
    - Accreditation on the way
- **Ethiopia**
  - Mr. Yoseph Abebe - Quality and Standard Authority of Ethiopia (Annex 10)
    - Tasks: Standard development, certification testing
    - Mechanical, electrical, chemical and microbiological testing
    - Chemical testing of products, food and all kind of waters
    - Analysed parameters/methods: AAS, ISE, pH, TDS, HCO_3^-
    - ISO and AOAC methods
    - No PT
    - No accreditation
- **Kenya**
  - Mr. Tobias Ololo - Kenya Bureau of Standards (Annex 11)
  - Jane Mumbi - KABETE CENTRAL WATER TESTING LABORATORY City of Nairobi (Annex 12)
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- **Lesotho**
  - Mrs. Mapaseka Makhaba Water-Sewage Authority (Annex 13)
  - Mrs. Polo Leboela - Standards section – Ministry of trade and industry (Annex 14)

- **Malawi**
  - Mrs. Patricia Nayeja - Bureau of Standards (Annex 15)
  - Mr Lewis Banda – Northern Region Water Board (Annex 16)
- **Mauritius**
  - Mr. Shabbir Hammad Ghoorun - Bureau of Standards (Annex 17)
  - Mr Thoonesswarr Beeharry – Central Water Authority (Annex 18)
- **Mozambique**
  - Mr. Mario J Jalane - National Lab for Food and Water Safety (Annex 19)
  - Dr. Moises Eugenio Mabui – Laboratorio de Engenharia de Mocambique (Annex 20)
- **Namibia**
  - Jürgen Menge, Cecilia Hinda, Geoffrey Kauta, George Mubita, City of Windhoek (Annex 21)
  - Mrs. Silke Rugheimer - Analytical Laboratory Services (Annex 22)
  - Mrs. M Conradie – Namwater (Annex 23)
  - Mr Renatus Shilangale – Central Vet Lab (Annex 24)
  - Mr Willem Swartbooi – Wingoc – Namibia (Annex 25)
- **Seychelles**
  - Mr Vivian Radegonde - Bureau of Standards (Annex 26)
  - Ms Marianna Toussaint, Public Health Lab, Victoria Hospital (Annex 27)
- **South Africa**
  - Mrs Merle Smuts, Umgeni Water (Annex 28)
- **Swaziland**
  - Mrs Zanele S'gwane, Rural Water Supply (Annex 29)
  - Mrs Edna Andrade, Manzini City Council (Annex 30)
- **Tanzania**
  - Mrs. Kezia Mbwambo, Bureau of Standards (Annex 31)
  - Mrs.Nadhifa Kemikimba, Water Laboratories Unit Maji Ubungo (Annex 32)
- **Uganda**
  - Mrs Hope Kamusiime, Bureau of Standards (Annex 33)
  - Mr. Patrick Kabuleeta, SGS (Annex 34)
- **Zambia**
  - Dr. Imasuki Nyambe, Zambia Water Partnership (Annex 35)
- **Zimbabwe**
  - Mrs. Naume T Mandizha, Zimlab (Annex 36)
  - Mr. Benson Gabi, Standards Association of Zimbabwe (Annex 37)

Expectations of Participants

The participants were asked for their expectations on the workshop. These were collected on the flipchart:

- Pesticides
- Microbiology
- Uncertainty of measurement
- Method of sampling
- Methods validation (extend)
- Requirement for accreditation

M. Koch – Lecture on "Quality and Quality Management" (Annex 38)

The following topics have been discussed after the presentation:

- Content of Standard Operation Procedures
- Procedure of accreditation
- Control Charts

Tuesday, 24th February 2004

The second day of the workshop was mainly filled with Dr. Koch's presentations about requirements for and experiences with PT in Germany and Europe.

M. Koch – Presentation on "Organizations" (Annex 39)

M. Koch – Presentation on "Types of Interlaboratory Tests" (Annex 40)

M. Koch – Presentation on "Water PTs in Germany" (Annex 41)

M. Koch – Presentation on "EPTIS" (Annex 42)

M. Koch – Presentation on "PT in the Accreditation Process" (Annex 43)

M. Musarurwa – Short presentation on "Reference Laboratories" (Annex 44)

M. Koch – Presentation on "Guidelines and Standards" (Annex 45)

M. Koch – Presentation on "Costs and Benefits of PT Participation" (Annex 46)

M. Koch – Presentation on "Demands on the Provider" (Annex 47)

M. Koch – Presentation on "Sample Preparation" (Annex 48)

M. Koch – Presentation on "Homogeneity" (Annex 49)

M. Koch – Presentation on "Stability" (Annex 50)

M. Koch – Presentation on "Sample Distribution" (Annex 51)

M. Koch – Presentation on "Assigned Value and its Uncertainty" (Annex 52)

M. Koch – Presentation on "Control Charts" (Annex 53)

Wednesday, 25th February 2004

The third day of the workshop started with some more presentations from Dr. Koch and Dr. Klinge. After lunch the participants had the opportunity to visit a laboratory.

M. Koch – Presentation on "Performance Assessment" (Annex 54)

M. Koch – Presentation on "Report / Certificate" (Annex 55)

M. Koch – Presentation on "Consequences of Negative Assessment" (Annex 56)

H. Klinge – Presentation on "BGR experiences on interlaboratory testing in developing countries and in Germany" (Annex 57)

M. Koch – Presentation on "Measurement Uncertainty" (Annex 58)

Labvisit

In the afternoon the group could visit the laboratory of "Namwater", the drinking water supplier in Namibia. In the laboratory drinking water is analysed for the main chemical parameters including heavy metals with ICP-OES as well as the main microbiological parameters.

Thursday, 26th February 2004

Day 4 of the workshop started with two presentations of Neville Tayler from SANAS (South African National Accreditation System).

N. Tayler – Presentation on "Accreditation of Proficiency Testing Scheme Providers in South Africa" (Annex 59)

N. Tayler – Presentation on "The SANAS / NML National Audit Program" (Annex 60)

Working group discussions

The participants formed three working groups:

- Group 1: Drinking water / Ground water
- Group 2: Waste water
- Group 3: Microbiological testing

to discuss the following questions

1. What are important parameters for a PT?
2. What are the constraints?
3. What would be an acceptable fee?
4. What would be the benefits of a PT?

Results of group 1:

1. Possible parameters:
   pH, EC, Hardness, Alkalinity
   Cations: Sodium, Potassium, Calcium, Magnesium
   Anions: Chloride, Sulfate, Nitrate, Bicarbonate, Fluoride
   Trace elements: Iron, Manganese, Zinc, Copper, Aluminium, Lead, Mercury, Cadmium, Arsenic, Nickel, Chromium
   Pesticide residues: Organochlorines, Organophosphates, Organonitrogens, Carbamates, Pyrethroides
2. Constraints:
   <u>Facilities</u>
   Lack of appropriate equipment – apparatus
   Lack of certified reference materials
   <u>Human ware</u>
   Lack of appropriate skills
   Lack of expertise of support services
   <u>Software</u>
   Lack of standardized methods
   <u>Implementation</u>
   Efficient transportation mode is expensive
   Bureaucratic customs clearance
   Lack of management commitment
   High participation fees
3. Acceptable fees:
   Suggesting US$ 150 for 2 rounds
4. Benefits:
   Increased confidence of the laboratory
   Increased competence of analysts and lab
   Removal of trade barriers
   Recognition of the lab – market confidence
   PT facilities accreditation requirements
   Can be used as a marketing tool
   Facilitates in legal proceedings
   Ensures safety and health to consumers
   Facilitates exchange of information
   Creation and development of data base

Results of group 2:

1. Possible parameters:
   Most important:
   - NH_4^+
   - NO_3^-
   - TP
   - TN
   - COD

   Less important or to complicated for the first round:
   - Cd
   - Cr
   - Pb
   - Ni
   - Hg
   - phenols
   - cyanide
   - other metals
   - oil and grease
   - fluoride
   - Cu
2. Constraints:
   Customs: Fees/duties – for couriers account? Regulations leading to delays
   Transport: Common courier? Cost /remote countries with fees charged
   Currency: Exchange rate –variation
   Time of delivery: Distance, Public holydays, Customs, Unforeseen circumstances, Perhaps confirm receipt of PT samples
   Buy in from management: Transport charges
   Fees charged –sales costs: may vary during year due to exchange rate/petrol price etc.
3. Acceptable fees:
   Currently in SA/Namibia/Lesotho: R900.00 per annum, (80 labs participating) R750 rands
4. Benefits:
   Quality assurance
   Comparison with peers and using a single PT provider
   Third party assessment/evidence of competency
   Identify needs for training and motivation for continuous improvement
   Economy of scale more cost effective

Results of group 3:

1. Possible parameters:
   Types of water:
   - Potable water
   - Bottled water
   - Surface water
   - Recreational water
   - Ground water
   - Total sewage effluent

   Parameters:
   - T.C
   - E. coli
   - Total plate count
   - Salmonella sp.
   - Clostridium (spores)
   - Pseudomonas
   - Coliphages
   - Staphylococcus
   - F. strep

2. Constraints:
   Costs: e.g. Uganda 108 punds per sample (QMUK)
   Customs: some countries e.g. Tanzania
   Resources:
   - Human: e.g. Swaziland, trained personnel
   - Logistics & utilities: e.g. power supply, consumables, back-ups

3. Acceptable fees:
   50 US-$ per sample/PT/round
4. Benefits:
   Trust from customers
   Step to accreditation
   Confidence in performance
   Tool for marketing
   Evaluation of lab performance

Before lunch Mr. Menge, head of the laboratory of the City of Windhoek, which have been visited in the afternoon, gave a short overview about their work and the water aupply situation in Windhoek and Namiba

J. Menge – Presentation on "Scientific Services, City of Windhoek" (Annex 61)

During the afternoon the participants had the possibility to visit the City of Windhoek lab and the water reclamation plant, which converts waste water and surface water to drinking water.

Gammams Laboratory:

Goreangab water reclamation plant:

In this plant a mixture of biological treated waste water and surface water is converted into drinking water by means of the following steps:

- Blending of surface water and waste water; if necessary addition of powdered activated carbon
- Flocculation and coagulation
- Air flotation
- Rapid gravity sand filtration
- Ozonation
- Biological activated carbon filtration
- Granular activated carbon filtration
- Ultrafiltration
- Disinfection with chlorine

Due to maintenance the plant was not working during the visit.



Friday, 27th February 2004

Based on the results Dr. Koch presented a suggestion (Annex 62) for first steps towards a pilot PT.

Regarding the matrix in a pilot PT it was suggested to start with drinking water / ground water, because unlike in the case of waste water, drinking water is directly related to peoples health. Microbiological proficiency tests are much more complicated and despite the great importance of such a PT it seems to be no good point to start with.

The parameters should me measurable also in small laboratories to include as many laboratories as possible. The parameters should be stable without the need of special pretreatment and transport, to gain experience with the sample distribution and problems with customs etc. Therefore the suggestions is to start with the kations: Ca, Mg, Na, K, Fe, Mn and the anions: Cl^-, NO_3^-, SO_4^{2-}, possibly also PO_4^{3-} and/or F^-. In the discussion the participants suggested to add Al and to remove PO_4^{3-} from the list.

In order to support the stability of the samples it is suggested to prepare 3 synthetic samples (demineralised water spiked with suitable salts). The preparation of the samples is easier if the bottles for the analysis of the kations is separate from that for the analysis of anions. So every participant would get 6 bottles.

Regarding the possible constraints with transport and customs it is recommended to distribute very stable samples (as described above), to choose a courier for the transport (e.g. DHL) and to accompany the samples with a certificate of the SADC secretariat.

To enable the participation of as many laboratories as possible, it is suggested to limit the participation fee to 100 US-$ for each laboratory and 50 US-$ for laboratories from least developed countries. This implies the need for funding of this

first PT round, because the expected amount of fee from all participants will not cover the costs for this pilot PT.
After some discussions the participants by a majority agreed with these suggestions. Asked if their laboratory probably would participate in such a PT under these circumstances, 22 participants answered with yes.
The PT has to be organised by a local provider. Dr. Koch listed the following requirement for a possible PT provider:

- Well equipped laboratory, to be able to analyse all parameters
- If possible accredited, to include the provision of PTs in the accreditation at a later stage
- The personal should have special organizational skills
- The laboratory should be able to provide the necessary human resources as well as the necessary equipment (balances,…)

After a short discussion the majority of the participants recommended “Umgeni Water” from South Africa as possible organizer. Mrs Merle Smuts was optimistic to enable this.
Details of the organization of this first PT have to be discussed between Umgeni Water, SADCMET and PTB. Dr. Koch promised to support the PT provider with advice.
It is expected to organize this first PT round within the next 6 months.

Certificates of attendance signed by Dr. Koch and Dr. Musarurwa were distributed to all participants by Dr. Stoll-Malke. The participants were asked to fill in a questionnaire for the evaluation of the workshop (Annex 63).

Dr. Koch, Dr. Musarurwa and Dr. Stoll-Malke closed the workshop with thanks to all speakers and participants.

Evaluation of the Questionnaire

The judgement of the participants regarding:
The venue of the workshop:

Very good	10
Good	22
Fair	2

Mean: 1.71 (1 for very good, 2 for good and 3 for fair)

The content of the presentations:

Very good	23
Good	12

Mean: 1.34

The ability of the speakers to bring the information across:

Very good	14
Good	21

Mean: 1.60

The handouts and documents:

Very good	19
Good	12
Fair	4

Mean: 1.57

On the question “Were all your questions answered?” 32 participants (91.4%) answered with Yes, 3 participants with No. The open questions were:

- Some uncertainty issues and calculations
- Areas in the field of uncertainty
- There is a need for a practical presentation in the statistics presentation

The most important topics have been (in brackets the number of participants mentioning this point):

- QM and QM tools (21)
- Measurement uncertainty (15)
- Sample preparation (11)
- Statistics (8)
- PT in accreditation (7)
- Standards and guidelines (7)
- Control Charts (7)
- Performance Scoring (7)
- Accreditation of the PT Scheme (6)
- Accreditation (5)
- Demands on the provider (4)
- Benefits of PT and costs (4)
- Presentations by the delegates (4)
- BGR experience in Europe/Germany and DC’s (4)
- What is quality? / importance of quality (4)
- Assigned value (4)
- First steps towards a PT (4)
- Group discussions (3)
- Homogeneity / Stability (3)
- Importance of water testing (3)
- Organizations (3)
- Consequences / Corrective actions (3)
- How to organize and manage a PT scheme (2)
- Report / Certificate (2)
- Lab visits (2)
- Sample distribution (2)
- Need to consider the demand of the customer (2)
- Traceability (2)
- PT results analysis (1)
- PT in microbiology (1)
- Water distribution system in Namibia (1)

30 particpants (85,7%) answered, that their expectations have been fulfilled.
The five not fulfilled expectations:

- Did not address the problem faced with laboratories who have not started participating in a PT scheme and how to help start.
- Because my country is a least developed, the country is far behind all this PT
- A PT scheme for microbiological analysis in water should have been set up since most participants do not have it.

- The focus was more on the chemistry side. Microbiologists had some difficulties.
- The recommendation to start only with chemistry PT does not address the health concerns because the quality of microbiological analysis are not addressed.

Benefits drawn from the workshop:

- Exposure to what other laboratories do in respect to water testing during the participants presentations.
- Different uses/benefits of PT and sharing of ideas and experiences from colleagues.
- Knowledge of demands of accreditation. Appreciation of current status of labs in SADC.
- Discussion with other labs regarding “problem” parameters and ways to deal with them.
- Understood well the requirements for participation on PT scheme.
- Getting chance to participate in the SADC PT in water testing.
- Importance of a proficiency testing scheme.
- Insight into PT, given to us as customers to PT. Information sources, our eyes open to wealth of Info.
- I had the possibility to know what the laboratories do.
- Having attended the workshop participants are to make network on sharing of information.
- Sharing experiences with colleagues from different countries. The importance of working with other people/labs through PT schemes.
- I came with no particular expectation, but after the workshop I am expecting that the project gets started.
- I’ve learned a lot on the assessment of PT’s in general. The uncertainty presentation was very valuable for me.
- Enlightenment regarding tools for quality assessment (knowledge gained from the lecturer) and the privilege of meeting like-minded participants from many countries in Africa.
- Widened and deepened knowledge on proficiency testing especially in the area of measurement uncertainty.
- Any laboratory is as good as the need to satisfy the customer. Proficiency testing only help that need to some extent.
- Informative with regard to what constraints the labs have on a day to day basis. Approaches to accreditation in general. Informative with regard to the situation in Europe and especially in Germany. Motivation to spend some more time on quality issues, procedures and improvements in general.
- Value of PT and practical considerations an arriving/establishing a PT.
- The workshop gave me more information to perform assessment of the lab.
- We shall have an opportunity to standardize laboratory practices.
- New knowledge on PT schemes. How to get a good management for best quality on the laboratory testing.
- Establishing a PT scheme through interlaboratory testing.
- The secrets of water quality measurement.
- The ability of the group to identify and agree to a common need.
- We are eager to implement proper quality management systems through proficiency testing schemes.

- Exchange and experience concerning intercomparisons.
- The need for quality management. Able to get possible venue for training of personnel.
- As from now I know how to prepare myself to become accredited.
- Knowledge on the QM systems, interaction with other scientists.
- Established contacts, learned more about PT.
- Given me motivation to go back home and start planning the lab to realise the importance of PT and accreditation.
- Importance of eater testing as water is an important resource and needs to be safeguarded.
- I am in a position to better implement quality control and assurance within my lab.

Any other comments:

- More workshops to be organised to address the way forward in handling issues of measurement uncertainty.
- The hotel accommodation was disgusting. The rooms were not being cleaned for the whole week, so was the conference room (untidiness). Would suggest more group work/discussions so as to participate all of us.
- The interaction both social and technical has been very good and also refreshing.
- PT is a step to accreditation of our laboratories, so let us have good plans for implementation.
- PT is very important and therefore we should be supported to start it and encouraged to sustain the PT scheme.
- The handouts and documents were sufficient, but we should have been issued with bags for carrying them. Very good workshop.
- Thanks to organizers, there is truly a need. Great to able to give input at the very beginning. Encouraging to know we are all having battles. In future would help to have assistance on topics such as method validation and AQC. What should be done at minimum?
- Organisers must try to call again workshop to evaluate how PT has faired after implementation.
- Since our lab is way behind in many respects, this provided for a chance to meet experienced people who can shed some light on how to improve on the day to day running of the lab in order to achieve the quality demanded or deserved by customers.
- I wish the organisers, CSIR, PTB etc. the courage to pull this through for all our benefit.
- Very good – I did not really expect to get all the information which was presented. Excellent!
- Workshop provided a platform for networking and understanding the different work and problems various labs face. The start of a PT scheme is welcomed and appreciated, and hope that it will be sustained once started.
- If this workshop can have a follow up, but most importantly to vigilantly ensure that the recommendations taken here are implemented and not just left there.
- Hotel food was recycled too often and a number of participants had stomach problems. However the workshop on a whole was a success and lively deliberations made it enjoyable.

- Technical operations to be promoted and strengthened by the technical forums without any political interference.
- Least developed countries need good management to implement PT schemes.
- The workshop should cater for those countries which are very slow in upgrading their laboratories.
- Lab visits 1 and 2 provided an insight of the new and state-of-art technology Windhoek has embraced.
- Thanks to all – organisers and fellow participants for a fruitful workshop.
- Need for a closer working relationship between the participating labs. A possibility for forming a “Testing Laboratories Association?” within SADC?
- We would welcome more frequent workshops of this type.
- A lot has to be done to come out with a better performance in the SADC region and its associates for getting the intended PT activities.
- There should be a workshop base more towards microbiology since there are still outbreaks of microbial pathogens due to water consumption. We also need to have a testing laboratory association with the SADC.
- Pt for the water microbiology should be considered as it is one of the most important parameter on the public safety.
- The 17 countries that were present agreed on quite a number of similar problems from country to country that if possible should be addressed. Observed that they are generally coming from equipment, i.e. unserviced and old equipment. Plus there is lack of knowledge in proper disposal of reagents and chemicals and other hazardous wastes from laboratories.
- The proposed PT scheme for the SADC countries will assist my lab. In evaluating its performance an water analysis.

Summary of the evaluation
From the participants answers the conclusion can be drawn that the workshop was a great success. It seems that most of the participants were satisfied with the content and had considerable benefits from the workshop.
The realization of the proposed first proficiency test is essential. And also the extension to microbiological testing seems to be very important.

Summary of the workshop

The workshop was an excellent opportunity for laboratories from the different SADC countries to get in touch with each other. This resulted in many fruitful discussions. It was possible to outline all problems and aspects of proficiency testing for water testing laboratories. The participants used the possibility to contribute with lively discussions and a productive working group session.
Problems, specific for the region, were compiled and possible solutions discussed. As a result of the workshop a first PT round is planned, organized by Umgeni Water, a South African water supply company in cooperation with the SADCMET regional coordinator. In this first round 3 synthetic samples will be distributed for the analysis of major cat- and anions. From this first round experiences will be gained for future PT rounds with more complicated matrices and parameters.

Recommendations for future activities

The first PT round can only be a starting point for a PT scheme in the SADC region. Discussions during the workshop showed the urgent need for such a quality control tool. At least the least developed countries need support for the participation in such a PT scheme. The first PT scheme is expected to show problems both in the implementation of the scheme as well as in the water analyses by participants. There is a need to discuss the outcome of this PT round.

The most urgent problem in water analysis turned out to be microbiological testing of drinking water, because the health of many people in the SADC region is endangered by microbiological contaminated drinking water. Due to the special difficulties to establish a PT scheme for microbiological testing and the lack of experience the present expert for such analysis, it was not possible to focus on this topic during this workshop.

Therefore it is recommended to organize an additional workshop after execution of the first PT round to evaluate it, to help the participants to interpret their results and to implement an additional PT scheme for microbiological testing with the help of an expert in this field.

This would be a helpful step to reliable water testing in the SADC region.

Uhingen, 23rd march 2004

Dr.-Ing. Michael Koch