

SADCMET WATER PT Scheme – 12th Evaluation Workshop 16th Nov – 18th Nov 2015, Gaborone, Botswana

Short report

Introduction

This short report summarizes the outcome of the above mentioned evaluation workshop for the 12th PT round on Chemical Analyses.

It will be provided to all participants of the PT round to facilitate corrective actions and improvement in the laboratories. A detailed report will be published on <http://www.sadmet.org>.

Report of the local coordinators

To facilitate the organisation of the PT rounds and to reduce shipment costs local coordinators (LC) for each country have been installed. The updated list of local coordinators will be available on www.sadcmnet.org. During the workshop the local coordinators were requested to give a short report on their activities and problems. Not all the local coordinators were presented at the workshop and therefore the LC are encouraged to complete the quarterly reports on a regular interval.

Report of the PT provider

The PT round was provided by NamWater in the same way as in the years before, financially assisted by PTB Germany and directed by SADCWaterLab Association. The 67 participating laboratories came from most of the SADC and EAC countries. Samples were prepared gravimetrically based on pure water by spiking with pure chemicals. Samples were distributed using DHL as courier.

For the evaluation and assessment the reference value was used as assigned value. A plausibility check was made using results from the National Metrology Institute of South Africa and two German expert laboratories, ISWA and IWW.

New software was developed by Dr M Koch to address the changes from ISO/IEC 17043 and ISO 13528.

Name and address of the PT provider and name of the round was inserted on the printed reports

- Usage of median is not possible anymore
- Graphical display of kernel densities included.
- Histograms are the usual vehicle for representing medium sized data distributions graphically - but they suffer from several defects
- The kernel density estimate is an alternative computer-intensive method, which involves smoothing the data while retaining the overall structure.
- The kernel density is a good method of reconstructing an unknown population from a random sample of data, overcomes the problems of histograms and has many applications in analytical chemistry.
- More information about kernel density diagrams http://www.rsc.org/images/data-distributions-kernel-density-technical-brief-4_tcm18-214836.pdf
- z-scores are rounded to one digit after decimal point as requested by ISO/IEC 17043 and ISO 13528

- assessment changed to satisfactory, questionable, non satisfactory as requested by ISO/IEC 17043 and ISO 13528

To calculate z-scores (the difference between the lab results and the assigned value divided by a standard deviation for proficiency assessment) the standard deviation of the data set (calculated with Algorithm A described in ISO 13528) was used whenever it was smaller than a limit agreed between the participants in the previous evaluation workshop. This limit can be regarded as a fitness-for-purpose criterion.

The PT provider faced the following problems:

- Again late registrations
- Problems with registration, submitting of the results on website
- Again no registration forms causing a lack of laboratory information
- For 2015 the registration and the submission of results were done in parallel (via website and manual)
- Laboratories are still sending files > 5MB NamWater email.
- Return date for the results was extended

Results of the evaluation and assessment

Mrs Merylinda Conradie, the coordinator from NamWater, Namibia explained the details of the evaluation and assessment. The most important facts are summarized here, for more detailed description please see the full report.

Sulphate

- Quite good agreement between means and ref.-values
- Average recovery (91.9 was lower than in the last rounds
- STD are still quite high, especially for low conc.
- Still many data outside the limits, especially for the low level
- 32% of the data is outliers (34% in 2013) (20% 2014)
- Still many methods indicated as “other”
- Not a big change compared to 2014

Chloride

- Average standard deviation – no real improvement
- Many labs have good results, but some are continuously deviating
- Problems with the endpoint detection in argentometric determination
- Obviously some problems with the spectrometric method

Fluoride

- Many results too high results for lowest level mainly for the colorimetric results
- STD for the lowest level is 63.47% - improvement
- Decrease in the percentage of non-satisfactory results – 59 to 44.4 %
- Many results are too high - ISO 10359 method (Electrochemical probe)

Nitrate

- Still problems with reporting of NO₃ in the wrong units
- Labs either do not read / do not understand / are not able to calculate or convert to the correct unit
- STDs very high – mostly because of wrong units
- Percentage of non-satisfactory results again very high (units!) – Improve from 48% to 46.5%

Phosphate

- Laboratories reported in the wrong units again
- Standard deviations bit better

- Percentage of non-satisfactory results increased from 35-42 %

Total dissolved solids

- Again method information was reported as “other”
- Methods was reported as “an electrode method”? These are obviously different measurands!!
- Average recovery was good
- STD’s still too high
- Percentage of non-satisfactory results improved a bit from 34% to 29.8%

Conductivity

- Still serious problems with units
- STD of the values with correct units were below 5.8%
- Percentage of non-satisfactory results came down from 40% to 34.5%

Calcium

- Good average recovery
- STD are high
- Percentage of non-satisfactory results increased from 31% to 69.3% 31%

Magnesium

- High number of “other” methods
- STD higher too high
- Percentage non-satisfactory results increase from 39% to 46.2%

Potassium

- Average recovery is ok
- STDs still outside the limits
- Percentage of non-satisfactory results more or less the same from 30% (214) and 31.4% (2015)

Iron

- Significant improvement for the lowest – from 68% (2013) to 28% (2014) and 36 % (2015)
- Number of outliers increased a bit

Manganese

- STDs much better than last year, comparable to previous rounds
- Percentage of non-satisfactory results reduced from 49% to 30.2%

Aluminium

- Percentage non satisfactory results improved
- STDs between 28 and 43 %
- Percentage outliers reduced from % 27% to 20.6%
- Problems with the AAS method

Lead

- Still problems with the lowest level – high blank?, high STD (66.20% !)
- STDs for the other levels are also improved from 2014 to 2015
- Problems with AAS method

Copper

- Percentage non-satisfactory results decreased from 21% 19.5%
- Standard deviations for under 20%

Zinc

- Percentage non-satisfactory results reduced from 21% to 19.5%
- STD varies between 11.59 to 16.17%
- The higher SD for the lowest level maybe due to a lower conc.

- For the two higher levels everything is fine

Chromium

- Blank problems with the lowest level?
- The colorimetric methods again has a high number of too low values – is that a method to determine Cr(VI)?
- Problems with the graphite furnace method
- Percentage non-satisfactory results similar than in 2014
- SD varies between 19.2 and 31.53

Nickel

- Improvement from 2014 tot 2015
- STD between 8.8% and 13.23%
- Percentage non-satisfactory results reduced from 25% to 16.7%

Arsenic

- Low number of values
- Percentage non-satisfactory results similar than in 2014
- Problems AAS and hydride technique

Cadmium

- STDs varies between 12.17 % and 35.75 %
- Percentage non-satisfactory increased from 21% to 32.5%
- Low level is still a challenge

Cobalt

- SDS below 10% for all three levels
- Atomic absorption problems – too high values

Some of the parameters still indicates that there are high standard deviations. Some laboratories are continuously performing well, some are improving, but others constantly deliver bad quality without any change.

Final remarks:

21 laboratories were successful with the anions – not all of them did all the parameter (only 3 did all 22 parameters)

- 22 laboratories were successful with the cations – not all of them did all the parameter (only 3 did all 22 parameters)
- 14 laboratories were successful overall – not all of them did all the parameter (only 3 did all 22 parameter)
- The evaluation and assessment procedure is fit for the purpose
- SDS are still high for some parameter and levels.
- The same mistakes are being done - Reporting of results in wrong units (N and not NO₃ and as P and not PO₄)
- Many laboratories does not indicate the method used and some report IC, AAS etc.
- Laboratories report above the ranges that are supplied to assist them to prevent outliers.
- Corrective actions are still not implemented and the root cause analyses are not done.
- Laboratories that struggle with methods do not make use of the recommended methods.
- The web portal will be improved and will have to become compulsory to submit results to eliminate mistakes
- Laboratories should make use of the ranges provided.

- Use old PT samples to immediately implement corrective action
- Use quality control sample
- Ask for assistance if you need it. The option to put you in touch with a good laboratory for a specific method is still available

Group discussions and their results

There was a general discussion on problems and specific issues that the participants wanted to discuss.

There was a presentation on the Fish PT and it was discussed and agreed that information will be forwarded via the local coordinator to possible interested laboratories in their respective countries.

Fees:

It was decided that the fees will remain the same for 2016.

Evaluation of the PT results during the workshop:

- It was decided the annual presentation on the evaluation of the PT results should be shorter and to focus more on training during the annual workshops.

Report prepared by:
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