Protocol on Assuring Quality of Test Results
AUA Center for Responsible Mining

This document provides a brief description for assuring the quality of soil test and calibration results for the CRM, AUA laboratory, as required by ISO 17025. The quality assurance of the test results can be a part of internal audit and should pursue the following objectives:

- to ensure that the used method and equipment are accurate and reliable,
- to exclude the contribution of human factors in a test process,
- to ensure the measurement traceability,
- to reveal a deficiency in the laboratory's quality system and testing activities.

The quality policy should be applied in a case of the test results indicate that non-conforming work could recur; or there is doubt about the compliance of the laboratory's operations with the established national or international requirements; or the laboratory wish to improve the effectiveness of its management system.

It is offered to check the accuracy or validity of the test result by the one or more of the following ways:

a. regular use of certified reference materials and/or internal quality control using secondary reference materials;
b. participation in inter-laboratory comparison or proficiency-testing programs;
c. replicate tests or calibrations using the same or different methods;
d. retesting or recalibration of retained samples;
e. correlation of results for different characteristics of a sample.

In a case of quality control data are found to be outside pre-defined criteria (for example the difference of comparing data of retesting is more than 30%), planned action shall be taken to correct the problem and prevent incorrect results from being reported.

Using the certified materials. The expiration date of standards should be regularly checked. The standard with expired date should not be used for testing. The standard or other prepared solution with known concentration of the parameter can be used as a tested sample for checking of the device accuracy or calibration.

Inter-laboratory comparison. The inter-laboratory checking of the test results should be based on the following criteria: selecting a qualified laboratory that must be certified by national or international appropriate agency. The laboratory should be equipped with the appropriate device and method that must not be less sensitive that used in the audited laboratory (it is recommended to choose the alternative method, not the same one that is used in the audited laboratory).

The next criteria for inter-laboratory comparison are the identification of principles for selection of samples and their quantity for comparison tests. No single principles applied for the comparing samples' selection. It is better to select an each one sample with the less and high concentration of the measured

parameter (or apply the arbitrary selection), the reference sample and the sample with doubt test results for the schools/kindergartens in the subject community.

Replicate test. The replicate tests cover a range of approaches to quality control, which aim to assess the random error associated with different levels of the sample's test process. Replicate testing is better to start on the sampling procedure-- during sampling, the soil sample should be split into two sub-samples and then transported, stored, treated and tested as normal samples. The difference between the test results of replicate samples must not be more than 5-10%.

Retesting or recalibration. In this case, the test of the already treated sample should repeat under the same calibration or after new calibration. The difference between the test results of retesting/recalibration must not be more than 5-10%.

Correlation of the results with the samples features. The one of the techniques for the determination of the performance of used method of analysis is to take a correlation between test results and the samples features: to compare the data with the biological environment of the sampling site, to observe the pollution sources location and their possible impact on the subject area, etc.

Reference

ISO 17025-- General requirements for the competence of testing and calibration laboratories
https://www.iso.org/obp/ui/#iso:std:iso-iec:17025:ed-2:v1:en

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