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QOmAh PROFICIENCY TESTING SCHEMES

1.0 Qotho Profile:

- Qotho Laboratory Services is a newly established South African company, within the Tramecon group of companies. The group specializes in the provision of an array of support services to Laboratories in the Mining Industry. The services range from the design, equipping, commissioning and management of laboratories, to facilitating the source and supply of consumables and equipment to African operations. Our current client base includes operations in Zambia, the DRC, Tanzania, Ghana, Mali and Namibia, in addition to our established client base in South Africa.

- Qotho Laboratory Services has developed a number of proficiency schemes for the mining industry and it envisages to grow the range of commodities covered, substantially. Whist our initial focus is to assist with the improvement of the quality of analysis at African Laboratories, we aspire to service the global mining industry. It would be of great benefit and interest to African Laboratories if the PT Schemes are rolled our internationally. Participation in our schemes will provide laboratories with a means of assessing the accuracy and comparability of their results to peer laboratories over time. It will instil confidence in the performance of the laboratories – for themselves, their operations and also their client base. Through the scheme, Reference Materials will be generated, that will become an invaluable tool for further internal monitoring and calibration, to all laboratories involved. Qotho Laboratory Services aims to obtain its ISO 17043 Accreditation by late 2015.

2.0 Proficiency Testing Schemes

- Proficiency testing schemes entail the organization, development and evaluation of tests (of the same item or similar items) by several laboratories, according to predefined conditions.
- It is a requirement of ISO 17025, that Laboratories participate in inter-comparisons programs and/or PT schemes.
- In addition, any laboratory that needs to demonstrate the quality of its analytical results in an independent way should participate in proficiency testing schemes, since the quality of the analytical results is directly linked to the quality of service / product, to the market credibility and brand image.
- Participation in Proficiency Testing Schemes is an essential tool to demonstrate the technical competence of the laboratory and it allows to:
  - Compare own results with those obtained by other laboratories.
  - Confirm the correct initial validation of a method.
  - Use the data obtained from participation in Proficiency Testing Schemes for validation of measurement methods.
  - Determine systematic errors.
  - Improve the test method used.
  - Learn from the methods used by other laboratories.
  - Monitor the accuracy and precision of the method.
  - Encourage collaboration between laboratories.
  - Demonstrate technical competence against third parties.

3.0 Why choose Qotho as your Proficiency Test Provider?

- We are an independent service provider, therefore no opportunity exists for biased interpretation of results, as may be the case through in-house operated schemes.
- We provide standardized method preparation of testing samples in accordance with ISO standards.
- Participation in the Qotho-run PTS eliminates the need for laboratories to plan, organize and execute PTS, in addition to analysing and reporting the results since all these activities are taken care of by Qotho.
- The PTS samples are typical of those tested by laboratories on a daily basis, thereby replicating the daily testing work performed by the laboratory on samples received from customers.
- As a provider working towards accreditation according to ISO / IEC 17043, compliance with the requirements of this standard is objectively demonstrated.
- Access to all general benefits that regular participation in PTS brings, including presentations and providing technical feedback on your laboratory's unique performance.
4.0 **Quality Standards & Frameworks**

Qotho PT schemes complies with the requirements of the following international standards:

- ISO/IEC 17043 – Conformity assessment – General requirements for proficiency testing.
- ISO Guide 34 – General requirements for the competence of reference material producers.
- IUPAC International Harmonized Protocol for the proficiency testing of analytical chemistry laboratories.
- ISO 5725-2 – Accuracy (trueness and precision) of measurement methods and results – Part 2.
- Samples are prepared according to the ISO or other international standard & guidelines (e.g. ASTM, BSI etc.) for preparation of the particular commodity.

5.0 **Scheme Framework**

5.1 **Coordination and Responsibilities**

- Responsibility and coordination of the schemes lies with Qotho Laboratory Services.
- The Scheme Coordinator is responsible for the routine operations, monitoring & control of any subcontractors that may be used in the execution of the scheme.
- All practices and procedures are being documented in our internal Quality System.
- Contact persons:

  - **Hannelie de Beer** | **Qotho Scheme Director** | hannelie@qotho.co.za
    M: [+27] (0) 83 702 3393 | Fax: [+27] (0) 86 626 4982
  - **Lucky Mamba** | **Qotho Scheme Co-ordinator** | lucky@qotho.co.za
    M: [+27] (0)72 708 5886 | Fax: [+27] (0)86 731 6677

  Physical Address: 11 Electron Close, Kya Sands, Randburg, 2163;
  P.O. Box 6490, Cresta, Randburg. 2118, RSA

5.2 **Advisors & Advisory Committee**

- The technical and statistical expertise of advisors may be utilised from time to time. Where the inputs of an advisor have been used for a specific scheme or round-robin, this will be communicated in the final report of that particular round.
- An Advisory Committee, consisting of members who may or may not be participants of any particular scheme, but who have expertise on the particular commodity, is responsible for the overall direction of the scheme. The Committee will include a statistics expert.

5.3 **Type of Schemes**

- All the schemes operated by Qotho Laboratory Services can be classed as quantitative, simultaneous schemes, where the assigned values of the test items are determined only once results have been returned by all the participants, and participants are then assessed on the difference between their result and the assigned value.
- The schemes are of a "closed" nature meaning they have a defined start and completion date and have multiple rounds which require participation annually.

5.4 **Scheme framework**

- A minimum of 10 participants is required for a scheme to be initiated.
- Participants’ orders are processed and confirmed.
- Procurement/sourcing, preparation, packaging and Quality Control of test items.
- Test items dispatched to participants.
- Participants test the items and report the results and methodology used to Qotho, as instructed and within the agreed timeframe.
- Results analysed and performance of laboratories assessed, using appropriate statistical techniques.
- Reports written and issued to participants.
- Round reviewed and requirements identified, for future rounds.
- These reviews are scheduled for each quarter during the Laboratory Manager’s and Chemists Forum Meetings
- Commencement of next round.
5.5 Joining the Scheme & Scheme Costs

- All the currently available schemes, with details relating to types of samples, price and frequency, can be found in the Qotho PT Scheme Menu (QOTHO-PTS-GUIDE-008 for non SA companies and QOTHO-PTS-GUIDE-009 for SA companies).
- An application form for the various Schemes is attached (QOTHO-FORM-PT-003). This must be completed and submitted to Qotho for processing. No applications will be processed without an official order number.
- Participants will be invoiced, pro-rata, on an annual basis (Calendar year), and are expected to partake in all the available rounds for that year. Details on the number of rounds per scheme, are also included in the Scheme Menu.

5.6 Confidentiality

- In order to ensure confidentiality, participants in the scheme are allocated a unique reference code.
- This approach enables results to be reported without linking the results to any particular laboratory.
- Each laboratory will know their unique code and is therefore able to extract their own data from the report.
- A general list of the participating laboratories to each scheme will reflect on each round being reported.

6.0 Test Materials

6.1 Selection

- Participants in the scheme will be offered the opportunity to supply the testing material for a round. This will enable participants to obtain scheme data on their own matrix and material type. Please contact the scheme administrator to obtain details of quantities required, etc. All costs related with the supply and delivery of the material to our offices in Johannesburg, will be for the particular participants’ account.
- If participants do not volunteer material, it will be sourced by Qotho, at its own discretion – whilst still ensuring that the material meets the requirements and specifications of the relevant Scheme.
6.2 Preparation & Homogeneity

- Where relevant, samples are prepared according to the ISO standard for the preparation of the particular commodity.
- Prepared samples are divided by means of a rotary splitter, until the desired subsample size is reached.
- Homogeneity tests will then be conducted, as per the criteria of the Harmonized Protocol for Proficiency Testing of Analytical Chemistry Laboratories, ISO 5725, ISO 13528 as well as ISO Guide 35.
- If the samples pass the homogeneity test, then we will proceed with final packaging.
- If homogeneity is not achieved, the entire batch will be re-processed, until homogeneity is achieved.

6.3 Delivery and Retention

- Appropriately packaged samples are dispatched to participants.
- Once packages are delivered, the onus to maintain the integrity and stability of the material, transfers to the recipient thereof.
- Participants are requested to check the contents of the packaging upon receipt and to contact Qotho, should they consider that the integrity of the material has been jeopardised.
- The participant must retain the sample for that particular round until the final report from Qotho is issued for that round.

7.0 Reporting of results

7.1 Timing

- In order to enable reports to be processed and issued as soon as possible after the closure of the test round, deadlines for the return of results are specified and must be adhered to.
- Results received after the reporting deadline cannot be included in the report. The report is however available to all participants subscribing to the scheme, regardless of whether their results were submitted or not.

7.2 Choice of Analytical methods to be used

- Unless otherwise instructed, participants may use any test method that they believe technically appropriate.
- Participants are asked to treat the test material in the same way as they would a routine sample.
- The procedures used, must be stated when reporting the results.

7.3 Reporting format

- Unless otherwise instructed, results shall be reported in Excel format.
- It is recommended that results and calculations are checked thoroughly before reporting.
- The results should be reported clearly, in the format and units detailed in the scheme description.
- If calculations are used, only the final result must be reported.
- In general, results of 0 should not be reported – results should rather be reported as less than the detection limit of the procedure used.
- Where participants use CRM’s as part of their analysis protocol, it is requested that the results of such CRM’s analysed with the sample, be reported as well.
- Results may be rounded up or down for the purposes of reporting and may therefore not be identical to your original reported results. The effect of rounding may also mean that occasionally, percentages may not add up to exactly 100%.
7.4 Number of results
- Each participant may only report one result per analyte or as determined in the Letter of Instructions to Participant, which is dispatched with every round.

7.5 Turn Around Times
- All assay results must be reported to Qotho no later than 20 days (4 weeks) after receiving samples.

7.6 Collusion and falsification of results
- Not returning genuine results, defeats the objective of participating in a proficiency scheme.
- Certain measures are built into the scheme to try and prevent collusion.
- Participants will be contacted directly, if collusion is expected.
- The responsibility, however, ultimately lies with each participant, to operate and conduct themselves in a professional manner.
- Proficiency testing samples may not be outsourced or subcontracted to external laboratories.

8.0 Reporting of analysed data

8.1 Calculating z scores
The z score system is widely applied and accepted as a means of expressing the performance of a laboratory’s results in relation to the assigned value.

\[ z = \frac{x - x_a}{\sigma_p} \]

where
- \( x \) is the participant value.
- \( x_a \) is the assigned value.
- \( \sigma_p \) - the standard deviation for proficiency assessment (SDPA).

In general, the basic performance categories are as follows:

\[ |z| \leq 2.00 \quad \text{Satisfactory results, which generates no signals.} \]
\[ 2.00 < |z| < 3.00 \quad \text{Questionable results which generates a warning signal.} \]
\[ |z| \geq 3 \quad \text{Unsatisfactory results which generates an action signal.} \]

The results will be analysed using the ProLab Plus Software, which is specifically designed for planning, organizing, performing and analyzing of inter-laboratory tests and proficiency schemes.

8.2 Report format
Reports will be distributed electronically (pdf format), to all participants in the scheme. It will include details of the material tested, its composition, its assigned value, as well as graphic and tabular representation of participants’ (participant codes, not actual names) results and performance. Where appropriate, comparative analysis of the various techniques used, per analyte, will also be included.

8.3 Complaints, advice and feedback
Through continuous communication and feedback, Qotho Laboratory Services welcomes the comments of participants to the scheme. These can be forwarded to admin@qotho.co.za and please also copy the Qotho Scheme Co-ordinator - lucky@qotho.co.za. Our communications form QOTHO-FORM-PT-005 can be used for this purpose and is available upon request.
Where possible, practical and relevant, the necessary improvements will be incorporated into future rounds.

9.0 Reference Materials
On completion of a round, analytical values will be assigned to the particular samples, based on the results of the PT round. A list of all the material available and their assigned values, will be published on our web page. This material will be on sale to laboratories, for use as Reference Materials. The reference materials will be available to the participants of the scheme, at a significantly discounted rate.