

## Analytical results are precious

### At a glance

*"It's essential to verify the quality of sample data and apply effective statistical methods that can measure variability correctly".*

*If you could ensure the correct measurement of sample error, what would it mean for your project?*

### Sampling error must be measured correctly

Exploration drilling results can make or break the economic assessment of a mineral deposit, and obtaining high quality sample information doesn't come cheap. So when the accuracy of data is proven to be acceptable and 'fit for purpose' our clients are understandably pleased.

High quality information is required for resource estimation and effective mine planning. It is essential to ensure that the level of variability in the sample data is acceptable, that sample quality is verified logically and that the assessment is based on statistically unbiased methods.

This necessitates the use of advanced statistical treatment of measurements, such as taking quality control samples during a drilling and sampling campaign.

### The solution

It pays to apply methods that are specifically tuned to the statistical assessment of paired data sets and not 'fail' results when not required.

A number of statistical methods based on different calculations are applied in the industry, and to date there's no consensus on which is the most appropriate method. However, a solid mathematical foundation that supports the use of a specific statistical method for data which always consists of two measurements ('paired' data) has been researched and published by Stanley and Lawie<sup>i</sup>. This method is not only statistically proven but might also deliver results that are different when compared to other statistics applied routinely throughout the industry.

When other methods may cast doubt, the Stanley and Lawie method can prove that the available sample data is fit for purpose. It may also highlight issues not picked up using another method and avoid costly mistakes.

Key to their technique is the unbiased true variability of paired data, which is measured and used to predict the sampling error. The method can handle outlier values and be easily applied in addition to a score of other possible error calculations.

### How we help

We've developed in-house software that calculates a full series of possible sample error results quickly. The software produces a file with the statistical results for each individual data pair, and average sample statistics following the Stanley and Lawie method. This can be processed easily in an Excel spreadsheet for graphical display, while all individual results remain available for audit purposes. The program also calculates a full series of alternative methods used frequently in industry.

The automation of statistical calculations makes it easy to run checks and balances fast. Easy processing of results using a spreadsheet ensures valid judgments can be made as the user compares all possible error calculations, and the graphical format clearly illustrates the differences. This leads to more objective and cost-effective decisions being made.

It's our view that the Stanley and Lawie method for paired data should be included in the assessment of sampling error – it could be the difference between success and failure.

If you have any questions about how this may impact your project, please feel free to contact me on +61 8 9269 6200 or via email at [aloyus.vfoortman@coffey.com](mailto:aloyus.vfoortman@coffey.com).

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<sup>i</sup> *Average relative error in geochemical determinations: clarification, calculation, and a plea for consistency, CR Stanley D Lawie, Exploration and Mining Geology Vol16 No3-4, pp. 265-274, Canadian Institute of Mining Metallurgy and Petroleum, 2007*