BASIC ASSAY LABORATORY QUALITY ASSURANCE

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Analytical laboratory bias is still a serious issue that causes inaccurate and sometimes materially unacceptable numbers; impacting on processing decisions and financial valuations.

Bias can only be measured by inter-laboratory testing. In a mineral exploration or mining production environment this translates to having a well designed assay quality assurance program with appropriate control samples, data quality objectives and control rules. An effective program would report auditable economic element control sample results showing (for example) bias <0.1%, CV <1%, detection of critical systematic error >90% and a false rejection rate of <5%.

Control samples to test for bias need to be matrix reference materials whose property values have been allocated on the "basis of agreement" among independent measurement results. For various technical reasons this will not necessarily translate to direct traceability to Standard International units. The two assumptions allowing "basis of agreement" properties are: that there will be enough capable labs and that the results from each lab will be statistically compatible. To overcome the "inter-laboratory issue" and to achieve "a property value having satisfying uncertainty" (ISO words); RM producers raise the minimum number of laboratories involved and scrutinize the data with the aid of outlier treatment techniques. This should lead to a very accurate measure for a given method; notwithstanding the underlying assumption that what the good inter-laboratory labs reported was accurate.

However an amount of bad data may have an effect, resulting in limits which may be too broad for effective production process monitoring by a single laboratory and the RM consumer may wish to set tighter limits based on their own control measurements and data quality objectives.

Data quality objectives need realistically high probabilities for error detection and realistically low probabilities for false alerts; taking into account the cost implications if limits are set too tight or too loose. The limits set, for each process related operating quality requirement, should reflect realistic operating specifications, with allowable levels of inaccuracy (and imprecision) for different grades and types of material.