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Use of Certified Reference Material (CRM) in the QA/QC of the Assay Data in Mineral Exploration Projects

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Control charts are widely used to present QA/QC results of assay data in mineral exploration and mining. These charts are typically constructed under the assumption of a statistically normal distribution and characterized by a mean (μ) and standard deviation (σ) derived from Certified Reference Materials (CRMs) or standards. In these charts, the central horizontal line represents the expected mean (μ) of the CRM, while additional horizontal control lines are plotted at $\mu \pm 2\sigma$ and $\mu \pm 3\sigma$. These thresholds provide a framework for monitoring analytical performance and identifying potential deviations from expected values.

The assay data that fall beyond the $\mu \pm 2\sigma$ limits are generally interpreted as early indicators of a potential 'out-of-control' condition. The assay data that exceed the $\mu \pm 3\sigma$ limits are considered more serious and suggest a high likelihood of analytical issues requiring investigation and corrective action. The $\mu \pm 2\sigma$ lines are commonly referred to as warning limits, while the $\mu \pm 3\sigma$ lines are designated as action limits. Samples flagged as warnings or failures are typically subjected to further review, including re-assay or investigation of laboratory procedures.

This presentation reviews the current use and limitations of control charts in QA/QC workflows in mineral exploration projects. It also encourages a more critical evaluation of conventional practices and promotes a better understanding of the statistics behind them. The presentation will suggest some potential modifications to control chart use to boost their effectiveness in real-world mineral exploration datasets.