

# MineSense Technology Empowering Bucket Resolution Mine to Mill Reconciliation

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## **ABSTRACT**

Reconciliation is a powerful tool used by mining operations to compare the mass and grade of ore produced with what was estimated before mining. A primary objective of reconciliation is to verify that estimated metal production in the plan is achieved during processing, allowing issues to be identified early for which adjustments can be made across the mining value chain to improve recovery and maximise efficiency.

Traditionally, the mine plan is based on estimated mine grades using sampled exploration drillhole or blasthole grades. Reconciliation discrepancies between the mine plan and mill are common due to such factors as insufficient or non-representative sampling, poorly conceived models, or unrecognised blast movement.

MineSense Technologies Limited (MTL) developed an X-ray fluorescence (XRF) sensor-based ore classification system that is installed on mining equipment to provide real-time grade estimates of run-of-mine material at bucket, truck, or belt-scale. Bucket level grade estimates provide insights into grade variations at the mine face that were never available before. This dataset eliminates some of the leading causes of reconciliation discrepancies and enables tracking of tonnages and grades from the mine face to the processing plant at bucket resolution with confidence.

Bucket-by-bucket grades at the mine face enable dynamic optimisation of the mine plan to stabilise the mill feed grade through blending of mine and stockpile loads. Beyond stabilising feed grade, mine-to-mill reconciliation combined with the full XRF spectrum response can generate proxy relationships to ore characteristics like hardness and recovery. These properties can then be predicted at the mine face, enabling further optimisation of the downstream mill feed, not only for grade, but also for power and water consumption, reagent addition, and recovery. This paper presents the benefits of MineSense technology for grade reconciliation and mill performance optimisation at a Cu Mine in BC (Canada).