

Potential Genomic Applications in the Mining Industry

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Many aspects of a mining operation are influenced by biology, often acting as a catalyst for geochemical processes. Mining processes can also have a significant impact on biological processes that surround a mine site, that to date, are poorly understood especially when long term impact is considered.

Genomics is a tool that can help to better understand the biological component related to the mining mining life cycle. In order to help demonstrate the potential applications of genomics in mining, a study was completed that evaluated literature, case studies and responses from key opinion leaders to understand whether and what value can application of genomics tools add to any part of the mining lifecycle. A number of potential opportunities were identified, including bioleaching, water treatment (active and passive), exploration geology, metal leaching and acid rock drainage, mining environmental assessments, and post mining (i.e. closure) activities. To demonstrate the business case for genomic applications for the mining industry, three cost benefit analyses were performed, include ore extraction, bioremediation and mine waste covers. Financial models were used in order to demonstrate changes to net present values (NPVs) when the biological component is optimized. The outcomes of the evaluations showed that significant NPV improvements are possible while also lowering environmental risk and uncertainty.