

# KellGold Cyanide-Free Low-Emissions Recovery of Metals from Polymetallic Concentrates

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## ABSTRACT

KellGold is a globally patented hydrometallurgical approach for the cost-efficient cyanide-free recovery of metals from polymetallic concentrates. As accessible ores become more complex with decreasing grades, a step-change technology is needed to unlock value in a sustainable and environmentally acceptable approach that is in accordance with modern world trends towards eliminating atmospheric emissions of SO<sub>2</sub>, As<sub>2</sub>O<sub>3</sub> and Hg produced by smelters and roasters. KellGold removes cyanide risks arising from its transportation, management and detoxification.

Bench-scale KellGold testwork on several concentrates typically shows >95% recovery of gold, silver, copper, cobalt, zinc, lead, antimony, and other value elements, including: (i) a high-grade polymetallic (Au-Ag-Zn-Pb-Cu) ore; (ii) a refractory Au concentrate with Cu and Co credits; (iii) a refractory polymetallic concentrate; (iv) a double refractory Au-Cu-Ag concentrate, and (v) a refractory high-As Au concentrate with minor Pt and Pd credits. Quantitative recovery and separation of value metals from leach solutions has been demonstrated at bench scale.

Engineering scoping studies have been successfully completed for the last two listed applications. One KellGold application considered a triple refractory Au-Cu-Ag concentrate to produce separate Cu, Ag and Au streams and recovery of high-purity (99.99%) refined products on site. A second KellGold application considered a high-arsenic (>10% As) refractory gold concentrate, with separation of arsenic for stabilisation to benign forms for safe storage as per industry standard. Conventional gold processing technologies would lose the contained minor Pt and Pd credits, which are recovered by KellGold.

Techno-economic comparisons of KellGold with conventional smelting, bioleaching and cyanidation indicate substantive benefits for implementing KellGold across the range of economic, environmental, logistical and optical metrics, also including lockup, pipeline and on-site refining. The world is shifting towards near-minesite, cost efficient, cleaner, low energy and low emissions approaches to minerals beneficiation, and KellGold is a clear path to this future.

## KEYWORDS

Gold, Refractory, Polymetallic, Cyanide-free, Sustainable, Environmental, KellGold