

# Optimization from the Mine to Mill and back to the Mine at Newcrest Lihir gold mine

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## **ABSTRACT**

Understanding and optimizing the material flows in the mine and processing plants are essential for operations to meet their productivity targets. Digital twin technologies create new insights and provides the operations with an opportunity to manage the production chain with variability in the ore feed, metallurgical processes and process equipment, and the business environment. Increased knowledge and situational awareness allow for better planning and control actions within the plant, resulting in better mineral recovery and process optimization. Recipe matching to variable ore types allows for savings in energy, water, and chemicals per produced ton of product. With the ability to test run any process configuration and operating strategy before execution, the risk of environmental, financial or safety issues are greatly mitigated.

This paper describes a case study how a physics and AI based metallurgical digital twin was developed at Newcrest Lihir gold plant in 2023. The case study discusses the key learnings and critical points in the ways of working in a digital twin project. The paper further discusses the site's technical architecture with existing systems for process control and IT infrastructure. Furthermore, the paper examines the future potential of closing the information loop from the production back to the mine planning systems.