Geometallurgical Domains in a Gold Deposit: Example of the Whale Tail Deposit, Amaruq Project, Nunavut

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INTRODUCTION

This current mining geology parlance among companies to report more and more on domain relationships at different scales, to predict gold recovery from multi-analyte datasets, to understand the role of the gold in the deposit is characterized by a great increase in exploration and mining geology. This trend is driven by the need for a more comprehensive understanding of the factors affecting gold recovery in mining operations. However, this new paradigm for exploration and mining geology may provide a competitive advantage in a mining context. One could envisage a methodological framework that integrates various domains of knowledge, such as mineralogy, petrology, and geochemistry, to better understand the complex systems that control gold recovery. This approach could help in the development of more effective and predictive models for gold recovery.

MATERIAL MASTER PROJECT

GOAL

To develop a method, using the Whale Tail deposit of Agnico Eagle Mines, Amaruq project, to create geometallurgical and geoenvironmental models using data from the exploration campaigns.

OBJECTIVES

1. To correlate a geometallurgical and geoenvironmental characterization of the Whale Tail deposit.
2. To correlate exploration data with metallurgical and environmental characterization. This research is aimed at improving the feasibility of a mining project and to limit environmental impact.

DISCUSSIONS & PRELIMINARY CONCLUSIONS

Gold recovery is mainly impacted by gold grade - positive relationship between grade and recovery. Gold is mainly observed with arsenopyrite-locilignite and pyrrhotite assemblages and is also observed as microinclusions in goudronline. Goudronline is rapidly destabilized in the secondary environment as confirmed by SEE tests. This sulfuranes is less abundant in iron formations (v.s.1%) than in komatites (v.s.1%).

The result of geometallurgical and geoenvironmental tests is in agreement with more conventional metallurgical and environmental tests.

HOW TO CREATE 3D GEOMETALLURGICAL AND GEOENVIRONMENTAL DOMAINS FOR A GOLD DEPOSIT?

The study area has been chosen because: 1) multielements analyses are available from the 2019-2020 exploration campaign; and 2) gold metallurgical characteristics have been identified (i.e., refractory gold, fine-grained gold, and pyrrhotite-rich zone) and environmental challenges exist (i.e., sulfidic and sulfatic). Mineralogical zones characteristics of the study area are mainly hosted by iron formation and locally by komatites.

Q4 Gold head assays vs percentage of gold recovery after micro-cyanidation test

A5 Arsenic concentration from selected samples vs As leaching after shaker + extraction test (PSI)

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