CUSTOMER STORY

First Quantum Minerals Ltd.

Panama

EMerald Geomodelling

Project facts

Location: Panama

Customer: First Quantum Minerals Ltd.

Project duration: April to July 2021

Project type: Mining

Project size: 240 line-kilometers

Key results

- Uncertainty estimates highlighted where more information was necessary

1. Background

Back in 2013, FQML collected geophysical data to map the depth of saprolite and to characterize mineral deposits in relation to a mining project in Panama. Saprolite is chemically weathered rock that has essentially turned into soil, which is common in humid, tropical climates. Knowing the boundary between saprolite and intact rock was consequential for the planning of infrastructure at the mine.

EMerald Geomodelling was hired in May 2021 to use its unique interface detection algorithm to generate a more detailed model based on the data that had already been gathered.

2. How it was done

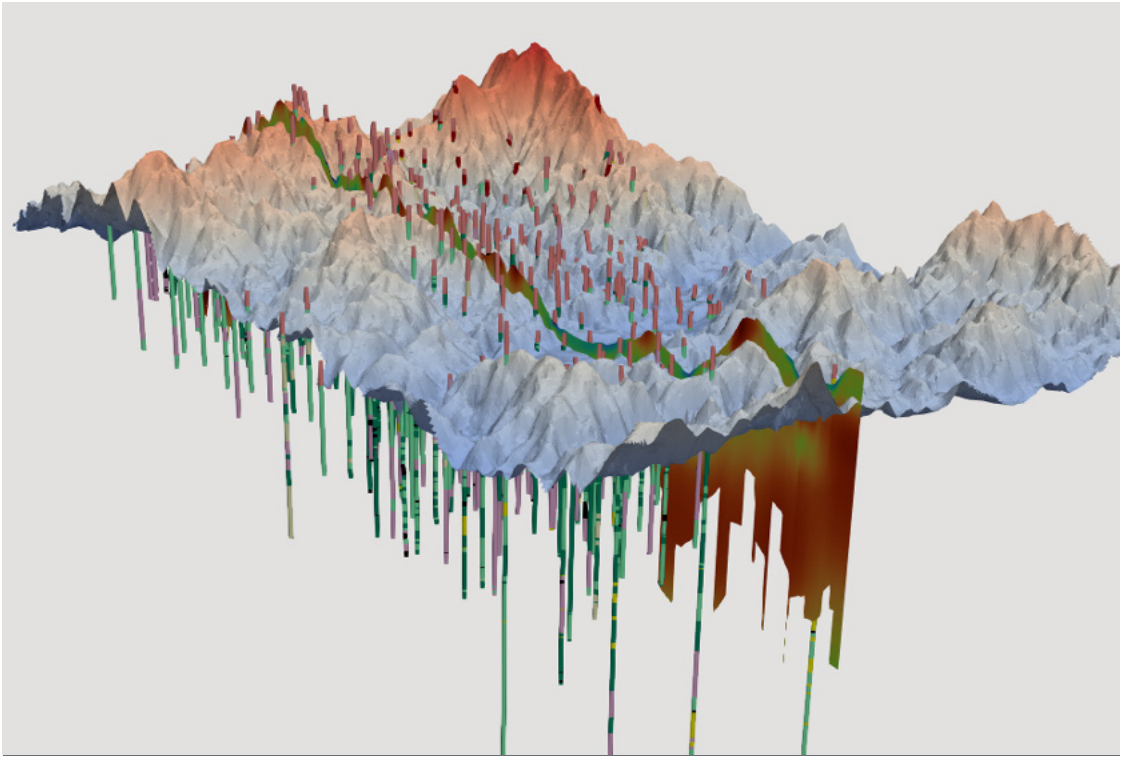
In the initial phase, EMerald Geomodelling received different datasets that the customer possessed from the previous sampling. The datasets included a resistivity model, core drillings and a terrain model. The resistivity model was based on previously collected geophysical data, inverted by another contractor.

In the following phase, the focus was on data pre-processing, which involved identifying and addressing issues related to terrain elevation measurements and core drilling data provided by the customer. EMerald Geomodelling also presented how the flagged issues could be solved and agreed with FQML on how to fix them.

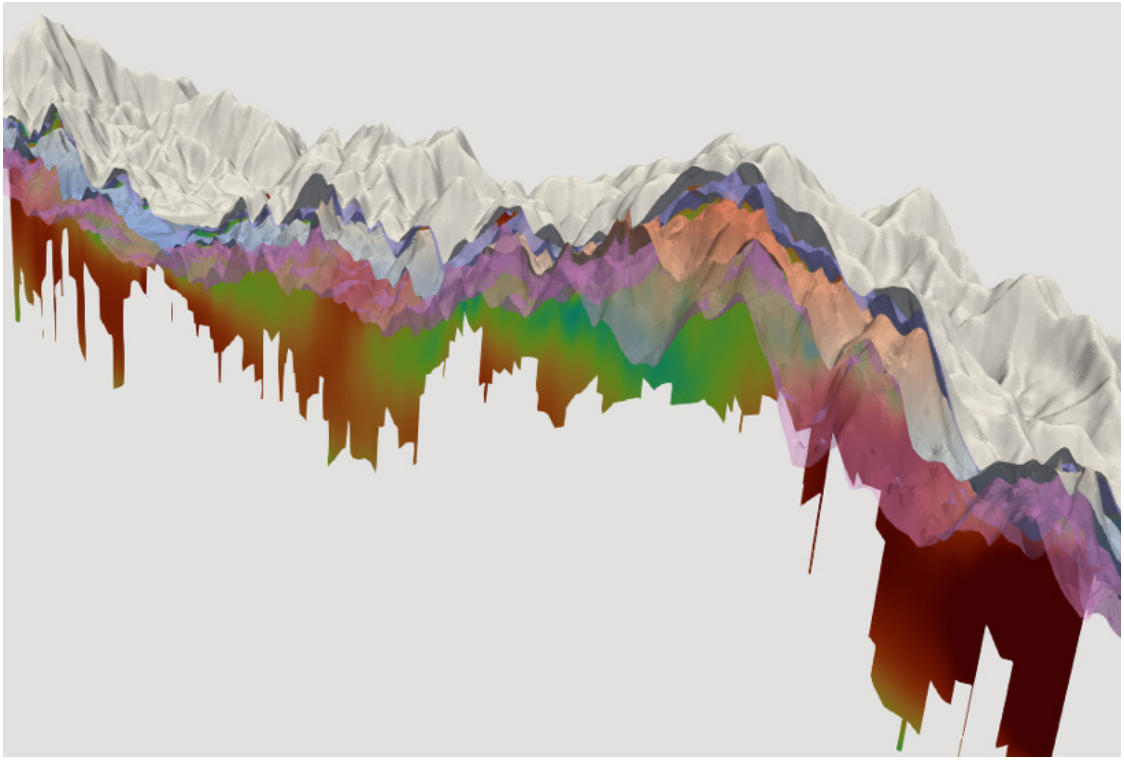
In the final phase, an artifical neural network-based algorithm was used for interface detection. The results were then presented in a 3D visualization to perform quality control esults, which included a customer meeting to interactively demonstrate preliminary findings.

3. Deliveries to customer

Overview



Upper and lower parts



4. customer results + actions taken

The main delivery was a model showing the interface between saprolite and hard rock, providing inputs into saprolite elevation and resistivity. Saprolites often have a good resistivity contrast with underlying rock, and airborne geoscanning methods are therefore usually suitable.

However, later drillings revealed that the bottom to saprolite was highly heterogeneous and often differed from the interpretation of geophysical data. Borehole sampling was dense near mineral deposits, but information on depth to saprolite was also necessary in areas further from excavation sites were boreholes were sparser. The model also included uncertainty estimates, highlighting areas in need of more information.

> *Our goal was a higher-resolution depth of saprolite model than what was possible based just on drill hole spacing of 100 m. The conductivity model delivered by EMerald has given us this result, while still respecting the vast majority of drillhole intercepts. We are now in the process of incorporating this new depth of saprolite model into the overall resource model, as it affects expected volumes of economic and non-economic material near the surface.*

Chris Wijns
Group Geophysicist at First Quantum Minerals

How we can help your company

1

Fast survey for large-scale project area

We collect electromagnetic data by conducting an airborne geoscanning survey. This delineates the subsurface and generates a resistivity model.

2

30-40% fewer drillings by utilizing high data accuracy

Based on the collected data and calculations, drilling is strategically executed by our customers at optimized locations, based on the uncertainty map.

3

Intelligent and efficient decision-making leading to substantial cost savings

We build a 3D model powered by the machinelearning algorithm to provide critical geological insights.

Interested in learning what we can do for your project?

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