Accurate portrayal of geological variance

Maptek™ Vulcan™ is employed to visualise and analyse complex vein geometries, providing better understanding of gold distribution and grade.

Located in the historic Juneau Gold Belt of Alaska, the Kensington Gold Mine is a classic orogenic gold deposit owned and operated by Coeur Alaska Inc.

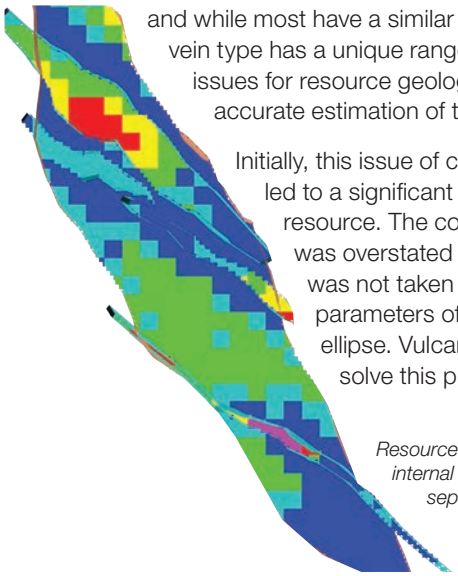
The deposit is defined by dense vein arrays with gold telluride minerals as the main ore bearing phase and is mined through underground long hole stoping. Coeur Alaska acquired full control of the property in 1995 and began production in 2010.

Since the exploration stage and throughout the production stage Maptek™ Vulcan™ has been used for nearly all technical processes including grade control, resource estimation, surveying, short and long term planning, drill and blast, and reserve calculation.

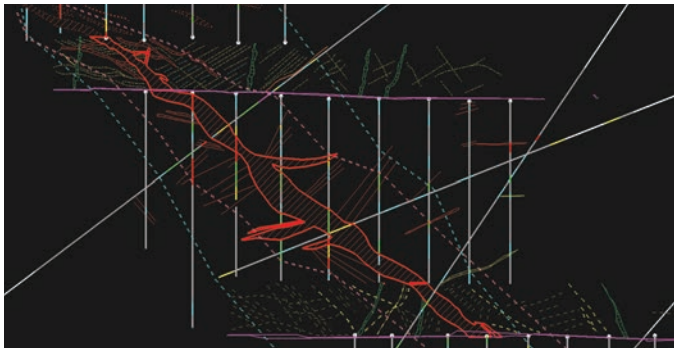
The most challenging geological aspect of the Kensington deposit is the unique vein geometries. The deposit is defined by a combination of shear, extensional, sigmoidal, and fault-fill veins. Therefore, the economic domains are not defined simply by vein boundaries, but by a limit where vein density drops and gold grade falls below economic cutoff.

The economic domains contain many or all vein types, and while most have a similar north-south strike, each vein type has a unique range of dips. This poses issues for resource geologists working to create an accurate estimation of the deposit.

Initially, this issue of complex vein geometries led to a significant overestimation of the resource. The continuity of high grade was overstated because vein orientation was not taken into account for the parameters of the estimation search ellipse. Vulcan is used extensively to solve this problem.



Resource model with high grade internal sub-domains estimated separately. Hotter colours indicate higher gold grade.



Geological mapping and drill section interpretation combine to depict the complex vein geometries seen in the Kensington deposit.

Visualisation of drillholes and the various geological information from logging was integral. For example, high-grade continuity seems to be directly down dip. However, on analysing the vein distribution, it becomes apparent that the high grade is defined by a massive fault-fill vein dipping obliquely to the main domain boundaries.

These zones of internal high grade are grouped and estimated as separate sub-domains. Vulcan grade estimation functions helped create a seamless process for prioritising and estimating the grade of this complex set of nested domains.

> The variogram mapping tool in Vulcan allows dynamic analysis of grade continuity, providing an opportunity to test various orientations with little effort.

An improved understanding of vein geometries brings a more realistic resource estimation. This has led to strong reconciliation and prediction of grade, allowing for better mine planning and a more robust strategy. The understanding of vein distribution has also allowed for confident prediction of future high-grade zones within the deposit.

Thanks to
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Coeur Mining

Kensington Gold Mine is located in Berners Bay, southeast Alaska.