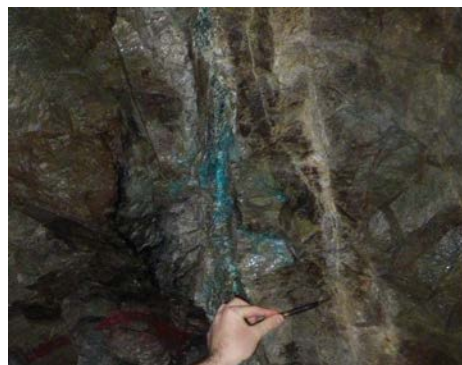


NARROW VEIN MODELING

- Mining Associates “Narrow Vein Modeling” system
- Grade and width estimation
- Estimate in unfolded space
- Semi-automated system tailored to each deposit
- Efficient estimation easily updated with additional data
- Designed for the modeling of narrow vein gold deposits, laterite nickel/bauxite & mineral sand deposits



Narrow vein at the Buriticá gold mine, Colombia

CAPABILITY

Mining Associates is a specialist global geological and mining consultancy, with offices in Brisbane and Perth.

The Mining Associates Narrow Vein Modelling system has been developed over a number of years to assist the geologist in interpretation, modeling and resource estimation of complex vein systems. The system allows for interpretation of several overlapping and cross-cutting vein arrays simultaneously. Drill intercepts can be re-allocated from one vein to another with ease and full recording of the changes in a relational database environment.

The system will assist in the extraction of data from a centralised database and may form the basis of drill program design, upgrading of resource estimates and categories, life of mine planning, production and stoping design.

The system will work for any geological system which is large in two dimensions and narrow in the third. It is designed specifically for vein gold deposits, but is easily applied to laterite nickel, bauxite, and mineral sand deposits.

EXPERIENCE

- **Buriticá, Colombia (Au, Ag)** – NVM system for exploration modeling, drill targeting, mineral resource estimate and upgrades, NI43-101 report
- **Imwauna, PNG (Au)** – NVM system for resource estimation, geology modeling and mine planning
- **Tiebaghi, New Caledonia (Ni)** - NVM system for resource estimation, short term planning for mining
- **Aurukun Qld (Bauxite)** - NVM system for resource estimation, drill program targeting and assessment
- **Vanua Levu, Fiji (Bauxite)** - NVM for field geology, exploration program design, and resources estimate
- **Tuvatu, Fiji (Au)** – NVM for resource estimation, geology modeling and mine planning.
- **Kainantu, PNG (Au)** – NVM for resource estimation.

REFERENCES

- **Automated Thin-Vein Modeling for Resource Development and Estimation**, Sine, J, Robson, S & Vigar, A, 7th Geology, Exploration and Mining Conference, May 2005
- **Resource Estimation for the Aurukun Bauxite Deposit**, Vigar A, Jiang G, Morgan M, MacDonald G, Smith L, Taylor I, Recklies M & Grobler C, 7th International Mining Geology Conference, Aug 2009

BENEFITS

- Works for any geological system which is large in two dimensions and narrow in the third. It is ideal for quartz veins, laterite nickel / bauxite, mineral sands
- Interpretation of several overlapping and cross-cutting vein arrays at the one time
- Estimate in unfolded space to honour vein thickness
- Integrate with surface geology and assay results
- The resource is reported by category, vein, cut-off grade, elevation and by x and y dimensions
- Used for exploration and resource drill hole targeting

