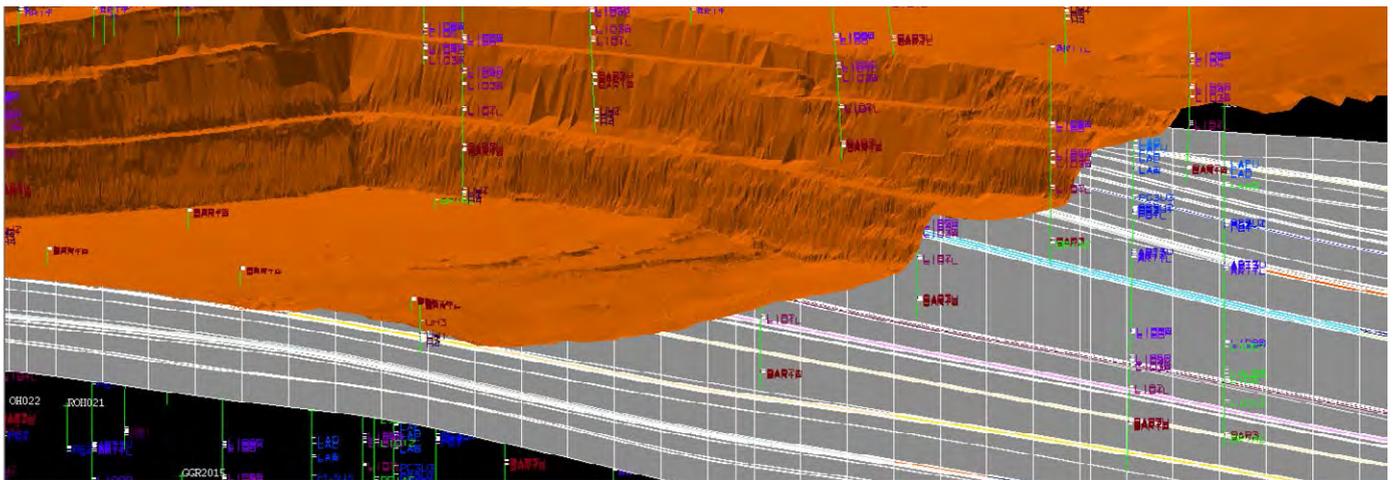


Ongoing improvements to mine planning

A coal mine in Australia discovered the benefits of HARP modelling for run of mine compositing and product tonnage calculations.



Glencore's Glendell coal mine, located at Ravensworth in the Upper Hunter Valley region of New South Wales, is a large open cut mine that produced 3.86 million tonnes of saleable coal in 2014.

Glendell is an excavator and truck operation targeting the seams of the Whittingham coal measures. Approximately 150 coal plies range in thickness from tens of centimetres to several metres. Many small waste partings occur between the coal plies.

The challenge

The site geologist presented Maptek™ with the challenge of finding a quick and flexible method for evaluating potential run of mine (ROM) working sections, while calculating yield weighted product tonnages for different moisture bases.

Moreover, a 'black box' approach was to be avoided, and all results needed to be checked visually and statistically prior to use.

Additional requirements included replicating the current output in a way that was easy for all stakeholders to use and providing a more rapid, visual method of finding potential target areas.

The current output was too complicated to incorporate into reserve calculations. However, a ROM HARP model generated in Maptek™ Vulcan™ is easily reserved against pit shell solids.

The solution would involve ROM HARP reserve output (including qualities) being created for logistics, coal handling and preparation plant personnel on a weekly basis for forecasting.

Conducting the process entirely within Vulcan eliminates risk associated with data import and export.

As well as weekly forecasting reserves, end of month, quarterly and annual reconciliations could be handled more simply. Errors in initial assumptions were able to be resolved quickly and easily.

HARP to the rescue

A Vulcan stratigraphic block model or HARP model proved to be the ideal approach. It was easily built from the available resource model without loss of geological fidelity and allowed creation and storage of the large number of variables required for the final output.

Additionally, a HARP model, like any Vulcan block model, can act as a large 3D spreadsheet, allowing scriptable calculations to be performed on any numeric or text type variable.

ROM HARP capabilities allow a simple specification-based set of rules for:

- > coal and waste quality compositing;
- > loss, dilution and recovery incorporation; and
- > seam combination.

It was crucial to create an output HARP model representing what is actually mined in the pit, while also allowing all of the input parameters to be supplied as constants or existing HARP model variables.

The method

The procedure was encompassed in a single script, run from a Vulcan command shell. Run time for the production model was around 20 minutes.

The first step was to add variables to the input HARP model to calculate and store loss and dilution parameters as a proportion of the resultant working section thicknesses. This required a precalculation run of the ROM HARP model thicknesses.

The first pass output HARP model contained yield values calculated at 6% moisture using supplied regression equations for each of the 150 plies.

The final ROM HARP process was then run. It included all of the relevant weighting rules for quality and mining parameters as well as the ROM parameters themselves (minimum mineable thickness, minimum separable parting and product to waste ratio).

This resulted in the output ROM HARP model.

A further script then evaluated the available data based on 9% product moisture and calculated the product tonnages within each block based on these new yield values.

This product tonnage was reported alongside the required working section weighted qualities. This will now form the input for ongoing planning processes at Glendell mine.

The solution is encapsulated within a single script. 'What if' scenarios can be run simply by changing parameters for mining or weighting.

Vulcan HARP modelling allows operations to easily run reserves. Visualisation and validation of results gives everyone involved confidence in the mine planning process.

*Thanks to
Daniel Saunders, Geologist
Glendell Coal Mine*



A simple scripted solution applying HARP modelling adds value to the overall mine planning process.

