

Fact Sheet Land Use

Mangoola Natural Landform Rehabilitation

Introduction

Glencore's Mangoola Open Cut mine in the Upper Hunter region of NSW is developing natural landform in its mine overburden rehabilitation.

What's believed to be the largest project of its type in the region will see the mine's entire pit disturbance area – some 1300 hectares – returned to landform and vegetation consistent with surrounding undisturbed land.

The Mangoola project is also believed to be the first Geoflur™ based landform constructed in Australia.



Background

Mangoola is an open cut coal mine located near Wybong, approximately 20 kilometres west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area.

The mine produced its first coal in February 2011 and has approval to produce 13.5 million tonnes of ROM coal per annum.

Mangoola's thermal coal is produced for export and domestic markets.

The mining operation is surrounded by undulating hills from the Hunter River to the east to sandstone escarpments to the west.

Traditional overburden rehabilitation techniques use uniform slope angles and flat top dumps (or hills) with contour drains and drop structures to manage water flow down the slopes.

Although this style of rehabilitation met the mine's original approval conditions, it was not considered an appropriate fit for the landscape surrounding Mangoola.

Following a successful natural landform trial in December 2012 the mine revised final landform plans for the entire disturbance footprint.





Natural landform design

Research into the Mangoola natural landform project involved studies of past works of this nature, notably an Australian Coal Association research project titled 'Sustainable Landscape Design for Coal Mine Rehabilitation'.

A number of preliminary steps guided the development of Mangoola's natural landform rehabilitation planning.

These included:

Initial testing of overburden and topsoil to gain an accurate understanding of erosion potential and water infiltration rates

Evaluating the characteristics associated with the natural landform of existing creek and drainage lines

Hydrological modelling of existing creek and drainage lines to compute the flows, velocities and stream powers

Determining ridge and creek alignments that blend in with the surrounding natural landscape

Determining preferred creek stream bed layouts using alignments similar to natural creeks in the general area

Once these key areas had been comprehensively researched, Mangoola mine planners and managers worked with external specialists to develop a mine plan using software based on Geofluv™.

Geofluv™ is a method adaptable to computer design programs, which designs landforms similar to

surrounding areas that can convey runoff water the same way that a natural landform would.

The model is used by the site mining engineers to develop appropriate dumps and ramps to produce a natural landform following shaping by bulldozers.

Natural landform design is now considered in all planning decisions for overburden dumps at Mangoola. The model's output is regularly compared to the overburden dump designs to ensure the general principles are adhered to.

After the natural landform has been built, locally-occurring vegetation types are selected for establishment, based on similar topography, slope, aspect and topsoil type.

Vegetation types include shrubby and open woodland, riparian forest, shrubland and native grassland.

Only species that occur in the local area are used in rehabilitation, and most of the seeds used are sourced from the local area.

Potential environmental benefits of this project include:

Better water quality through stability of landform

Reduced erosion potential

Reduced maintenance due to lack of specific water management structures

Increased biodiversity due to a range of topographic relief, appropriate planning for vegetation communities and habitat augmentation, which creates a more familiar terrain for fauna species.

More visual appeal in landform which, over time, should not look like mine rehabilitation.

Progress

A total of 1300 hectares of natural landform has been incorporated into Mangoola's mining plans.

The combination of natural landform, establishment of locally-occurring vegetation communities and habitat augmentation is delivering an impressive mine overburden rehabilitation effort.

Due to the success at Mangoola, Glencore is progressing the natural landform rehabilitation initiative at other sites, including its Ravensworth and Bulga open cut operations.

