

Low Angle Thrust Faults at Goonyella Riverside Mine

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ABSTRACT

The Goonyella Riverside Mine (GRM), located 30km North of Moranbah in Central Queensland, Australia, is known to be structurally benign relative to proximal deposits, with a limited number of small-scale structures that offset coal seams. Recent mining activities have exposed the north-south striking low angle thrust Kenya and Zimbabwe Faults. These faults vertically offset coal seams up to 25m and locally thicken coal seams through imbricate thrust systems constrained within the coal seams. Back thrusts associated with these faults have negatively impacted high-wall stability and resulted in increased stand-off from high-walls in areas containing geotechnical hazards.

The Kenya and Zimbabwe Faults have provided multiple challenges to the GRM Mine Planning team where mine designs are required to consider the recovery of the coal on both sides of the thrust fault whilst minimising coal loss and dilution. Mine scheduling needs to consider the variable coal tonnages in areas where coal seam thickening is present. GRM Geotechnical Engineers are required to consider the effect of the thrust faults and back thrusts on high-wall stability.

Unmanned Aerial Vehicles are utilised to scan exposed high-walls and enable geological mapping using the high-quality 3D images. Measure while drill (MWD) data from production rigs can provide local-scale intersections of the faults and coal seams. GRM Mine Geologists utilise the highwall mapping, MWD data and other datasets to model 3D surfaces of the fault planes and coal seam roof (top) and floor (bottom) surfaces. These surfaces are then utilised by GRM teams to ensure the safe and efficient mining of coal around these faults.