

# “Never give up, Maramarua K1 Pit Geotech performance – a mine operators perspective”

## **Abstract:**

The Maramarua mine is located north of Huntly within the Kopuku Sector of the Maramarua Coalfield. Maramarua has a long history of coal mining with operations having first commenced in the mid 1800's. Current mining operations are focused around the K1, KCQ and M1 pits. The focus for this presentation is on the geotechnical instability along the eastern wall of the K1 pit.

The K1 pit is hosted in a complex wedge structure that trends northeast and is bound to the northwest by the Miranda Fault and to the southeast by the Foote Fault. The Miranda Fault is a significant fault structure and has a deformation zone ~10 m in thickness with coal downthrown approximately 60m to the southeast. The Foote Fault forming the eastern structural boundary is a major fault structure with a deformation zone of ~100 m in thickness with the coal seam downthrown approximately 150 m. These faults in conjunction with sub-horizontal to unfavourably dipping bedding geometry have led to the instability along the eastern wall.

In early February 2020, during the K1 stage 2 design phase, movement along the northern limits of the eastern highwall was initially detected through the total station monitoring system, concentrated near the Miranda fault in the K1 pit. To aid stability, the pit design sequencing was adjusted to prioritize unloading the eastern wall. This involved reordering the stages, with stages 4 and 5 scheduled after stage 2. This strategic sequencing aimed to unload the deforming and unfavourably dipping designs of stages 2 and 4 first, to exposure the more stable Stage 5 wall geometry.

In May 2022 as part of the stage 5 design, geotechnical instability was observed in the southern section of the eastern wall, overtime due to weathering and the unfavourable geotechnical and geological conditions, this failure progressed towards the north to encapsulate the entire eastern highwall. Failure of the highwall was attributed to successive small circular failures within the Marine Tertiary units, which over time lead to failure across the entire highwall as opposed to a complex wedge failure or large circular failure which had previously occurred at the site.

Majority of the coal has now been won from the original stage 5 design through a staged approach with geotechnical and operational controls in place to manage the instability along the eastern highwall.