



ASEG-PESA 2015

Geophysics and Geology together for Discovery

24th International Geophysical Conference and Exhibition
15–18 February 2015 Perth, Western Australia

Geophysics of the Tropicana gold deposit

Minerals keynote paper

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SUMMARY

The Tropicana Gold Mine is located 330km east-northeast of Kalgoorlie, Western Australia. Discovered in August 2005 the deposit is the first world-class gold resource discovered in high-metamorphic grade gneissic rocks, in an Archean terrane not previously thought to be prospective for gold.

The contrast in petrophysical properties of host rocks observed across the Tropicana gold mine enable geophysical methods to assist in mapping the deposit. Geophysical methods applied at Tropicana include; regional aeromagnetics and gravity, high-resolution airborne magnetics, gradient array Induced Polarisation (IP), pole-dipole IP, detailed gravity, MIMDAS IP, 2D seismic reflection, 3D seismic reflection, helicopter TEM, and SPECTREM.

Initial gradient array IP combined with geochemical analysis of aircore drilling samples provided the most cost effective method to direct early diamond and RC drill testing of auger and soil anomalies. Integration of all available data within a 3D Common Earth Model (CEM) facilitates lithology constrained 3D potential field and 3D IP inversions. When combined with the lithological packages, structural architecture, alteration assemblages and zonation, and geochemical signatures the 3D CEM provides a powerful means of delineating ore positions and exploration targets.