

THE EFFECTIVE USE OF FORWARD MODELLING AND PETROPHYSICAL ANALYSES IN THE APPLICATION OF INDUCED POLARISATION SURVEYS TO EXPLORE FOR DISSEMINATED SULPHIDE SYSTEMS IN THE PATERSON PROVINCE, WESTERN AUSTRALIA

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The Citadel Project is a JV between Rio Tinto Exploration (RTX) and Antipa Minerals extending over 400 km². The project is targeting disseminated and massive copper sulphide systems beneath 40 to 120 m of transported Permian cover with intermittent Cenozoic sand dunes. Dipole-Dipole (D-D) and Pole-Dipole (P-D) Induced Polarisation survey configurations were chosen as a cost effective method to prioritise the 16 target areas for drilling. Induced Polarisation (IP) survey traverses over the known gold-copper-silver-tungsten Calibre and Magnum deposits and the high grade polymetallic Corker deposit illustrated the effectiveness of the IP method for detecting mineralisation and led to a 127 line km D-D and P-D Induced Polarisation surveys being undertaken in the 2016 field season. The IP surveys highlighted multiple chargeability anomalies along the Calibre structural corridor.

On completion of drilling, forward modelling of chargeability and resistivity data combined with petrophysical analysis of selected core samples provided a platform for testing geological concepts. In addition, it allowed the correlation of the chargeability/resistivity data with drilling results, and the validation of inversion results.

In 2017 a new Induced Polarisation survey program has been planned to further delineate Blue Steel target and evaluate the Calibre structural corridor. In spite of well-known limitations associated with the Gradient Array configuration, combining regional AEM surveys with forward modelling was able to illustrate this method as a cost effective solution for exploring the Calibre structural corridor.