THE MINERALISATION AND GEOLOGY OF THE PATAWARTA DIAPIR NORTHERN FLINDERS RANGES, SOUTH AUSTRALIA.

By

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ABSTRACT

The Patawarta Diapir is located in the northern Flinders Ranges, approximately 17 km north-east of Blinman. It has intruded into the late Proterozoic Wilpena Group sediments of the Adelaide Geosyncline. The elements occurring within the diapir consist of disrupted blocks of a variety of rock types, most of which can be correlated with rocks of Willouran age. The blocks are enclosed by a matrix of carbonate breccia.

Widespread Cu mineralisation is present in the diapir, mainly as epigenetic veins. Anomalous levels of Zn, Pb, As, Co and Ni are also found in rock chips and stream sediment samples.

Fluid inclusion data for quartz suggest a temperature of formation of the veins of approximately 150°C. Freezing point determinations indicate greater than 20 wt % NaCl equivalent on average.

Sulphur isotope studies suggest that sulphur in the mineralisation was essentially derived from evaporites, but a small contribution may have come from a mafic igneous source.

Origin of the mineralising brines is postulated to be through compaction of Callanna Bed sequences and leaching of base metals from Adelaidean (and possibly basement) rocks. Reduced sulphur and base metals are interpreted to have travelled together in the same brine and precipitation occurred in open fractures in the diapir.