A Geological and Geophysical Synthesis of the Svartliden Project, Sweden and its application in defining gold exploration targets.

by

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A thesis submitted in partial fulfilment of the requirements for the degree of Master of Economic Geology

University of Tasmania

March 2001
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‘Qu’est-ce après tout que l’intelligence? L’étymologie définit ce terme comme étant simplement la capacité générale de comprendre.’

Jacques-Yves Cousteau, 1989

‘translation: - What is intelligence, after all? Etymology defines this term as simply being the general ability to understand’
ACKNOWLEDGEMENTS

The undertaking of this thesis would not have been possible without the assistance and support of many people. I would like to extend my thanks to:

VIKING GOLD CORPORATION
Ken Phillips (Director) for authorising this research on the Svartliden Project, and for giving moral and financial support over the last 4 years. Scott Marsh (former Exploration Manager and former CODES Masters graduate) for giving me encouragement to undertake this research project. Greta and Pereric Stenvall for allowing their shed to be used as a temporary core farm, for feeding me on those cold Scandinavian winter nights, and for shuffling snow to allow access to site and the core farm.

DRAGON MINING NL (owner of Viking Gold since December 1999)
James Searle and Neale Edwards for providing further geological information obtained after completion of their due diligence study in 1999, and encouragement in the completion of this thesis.

CODES SRC (Centre for Ore Deposit Research)
Dr Michael Roach for help in organising and executing the project, as well as his geophysical input. Dr Robert Scott for providing assistance with petrology and structural geology. Dr J. Bruce Gemmell for organising and co-ordinating the CODES Masters course. Marilyn Feast for her assistance in all administrative matters and for providing the much-needed coffee required, to keep us going during our 2 week courses in Hobart. Simon Stephens for the preparation of thin sections and polished mounts.

Most Importantly, I would like to thank my wife, Céline, for her continual encouragement, love and support throughout the last 2 years, regardless of how irritable I became. MERCI BEAUCOUPE!!
The Svartliden Project is located in north central Sweden, 75km west-northwest of the town of the Lycksele. The geology comprises of a Palaeoproterozoic package of intercalated turbiditic sedimentary rocks and extrusive coherent and non-coherent basaltic rocks.

Gold mineralisation is associated with diopside + green amphibole + silica + arsenopyrite. Alteration is best developed along the intersection lineation between bedding and the primary cleavage. Mineralisation is concentrated in areas of low shear strain formed by the pressure shadow effect from the regional rotating syn-orogenic granitoids.

Pyrrhotite is the most pervasive sulphide and is found as a primary mineral in carbonaceous sediments and as a late-stage sulphide in the “Mineralised Zone”. Pyrrhotite is responsible for the conductivity, chargeability and, along with magnetite, the magnetic susceptibility found in the Svartliden shear zone.

Ground magnetic and electromagnetic surveys were carried out over the project area. The ground magnetics does not differentiate the magnetite-bearing volcanics from the pyrrhotite-bearing carbonaceous sediments and the “Mineralised Zone”. The ground electromagnetic survey defines high conductive zones, generated by the pyrrhotite-bearing sediments and the “Mineralised Zone”, within resistive granitoids and volcanics.

Downhole apparent resistivity, IP and magnetic susceptibility were conducted on three drillholes along 1700mE. The magnetic susceptibility, as with the ground magnetics, is unable to differentiate magnetite-bearing volcanic rocks from the pyrrhotite-bearing units. Apparent resistivity has an inverse correlation with chargeability.

Log transformation of the ground in-phase EM data delineates first- and second-order conductive anomalies. First-order anomalies represent the pyrrhotite-bearing carbonaceous sedimentary unit. Second-order anomalies represent the pyrrhotite-bearing “Mineralised Zone”. Second-order anomalies, calculated from in-phase EM data, can be used to target areas for gold exploration at both a project and regional scale.
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