

Pontifex & Associates Pty Ltd

MINERALOGY – PETROLOGY · SECTION PREPARATION

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MINERALOGICAL REPORT No. 9349

by Ian R. Pontifex MSc.

July 15th, 2008

TO : Jim McKinnon-Matthews
Mithril Resources Ltd
60 King William Road
GOODWOOD SA 5034

YOUR REFERENCE : Samples received from Jim 18/6/08

MATERIAL & IDENTIFICATION Four sulphide-mineralised drill core pieces
Drill Hole Number INDD01, Depths 149.59,
156.0, 158.32, 159.0

WORK REQUESTED : Section preparation, initial urgent report in
sulphides by phone, written
petrology/mineralogy assessment.

SAMPLES & SECTIONS : Returned to you with this report.

DIGITAL COPY : Emailed 17/7/08 to:
Enclosed with hard copy of this report.

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INTRODUCTION

Four drill core pieces from drill hole INDD01, in the Northern Territory, at depths 149.59, 156.0, 158.32, 159.0 are discussed in this report. These were received from Jim McKinnon-Matthews 18/6/08 for urgent polished section preparation and phone report on sulphides, which was done 19/6/08. This report provides a summary of the sulphides as then reported, also the nature of the host rock as seen in this section of just two samples from 156.0m and 158.32m.

Sulphides

The sulphides in all four of these samples are coarse to very coarse and form an integral part of the whole-rock coarse granular metamorphic fabric, variably as irregular grains, mostly monomineralic but some as simple composites and continuous interstitial/intergranular to the host silicate mineral aggregate. All sulphides are fresh/unoxidised, but irregular patchy and somewhat marcasitic (secondary) pyrite occurs in the sample at 158.32m and at 159.0m, which seems to be after pyrrhotite, but other coarse pyrrhotite in the same aggregates is found.

The sulphides present and their visually estimated volume % abundances in the four polished sections are as follows:

	149.59	156.0	158.32	159.0
chalcopyrite	15%	10%	3%	1%
Pyrrhotite	45%	15%	5%	20%
Pyrite, primary, subhedral/euhedral	Nil	20%	30%	40%
Pyrite, marcasitic and probably secondary after pyrrhotite	nil	nil	12%	20%
Magnetite	nil	1%	nil	5%
Silicate gangue minerals	40%	55%	50%	15%

DETAILED OPTICAL SCANNING FAILED TO REVEAL ANY NICKEL SULPHIDES IN THESE POLISHED SECTIONS.

HOST ROCK SILICATE MINERALOGY (Samples 156.0m, 158.32m)

Thin section 156.0m consists of at least 35% loose packed, metamorphic, subhedral/subequal and pale to dark green pleochroic hornblende crystals, all unaltered/pristine. These are mostly about 2mm individual size. Interstitial areas sporadically between these crystals are occupied by opaque sulphides (pyrite > pyrrhotite > chalcopyrite) also by plagioclase (15%), rare random biotite flakes of brown biotite (5%). There are also scattered subhedral crystals of apatite (2%), average size about 0.5mm, and bleb-like inclusions of apatite, average size about 0.2mm, commonly in hornblende, also forming about 2% of the whole rock.

Thin section 158.32m was selectively cut from a relatively sulphide-poor part of this subsample with pale areas up to 25 x 40mm of silicate gangue, which are dominated by compact inequigranular aggregates of random fine to very coarse subhedral plagioclase crystals, locally with stressed/bent twinning. Irregular networks within this plagioclase-rich network consist of granular dark green hornblende, and subequal clusters of quite coarse decussate dark-brown biotite with similarities, therefore to the silicate assemblage at 156.0m. The biotite locally replaces amphibole.

A mineral not seen in the 156.0m selection is (optically colourless) scapolite as highly irregular skeletal anhydrite as a late-stage (?metasomatic) phase, selectively filling voids and microfissures within plagioclase, forming about 10% of the section. Accessory small crystals of apatite and of sphene occur within the hornblende biotite aggregates. There is a single 'ring', 2mm diameter, of small (0.3mm) euhedral allanite crystals, enclosing and partly intergrown with a core of apatite, with this composite enveloped by coarse biotite.

Interpretation

The collective petrographic/mineragraphic compositions and textures indicate that these samples represent a metamorphosed former mafic igneous hostrock to (originally) magmatic sulphides of Fe > Cu. Notably the existing amphibole replaces former pyroxene, and the accessory euhedral apatite crystals and the allanite-apatite association are part of the basis for this interpretation.