Pontifex & Associates Pty Ltd

MINERALOGY – PETROLOGY · SECTION PREPARATION

A.B.N. 25 007 521 084

26 Kensington Rd, Rose Park
South Australia 5067
Tel: +61 8 8332 6744
Fax: +61 8 8332 5062

PO Box 91
Kent Town SA 5071
AUSTRALIA

Email:
ian@pontifexpetrographics.com.au
Website:
www.pontifexpetrographics.com.au

MINERALOGICAL REPORT No. 9097

by Alan C. Purvis, PhD.

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TO :	Mr Gus Bravo Stellar Resources Ltd 63 King William St KENT TOWN SA 5067
YOUR REFERENCE :	Order No. TBA
MATERIAL :	Drill core samples (4)
IDENTIFICATION :	STO1: 35.3, 80.6, 90.55 STO2: 31.4
WORK REQUESTED :	Polished thin section preparation, description and report.
SAMPLES & SECTIONS :	Returned to you with this report.
DIGITAL COPY :	Enclosed with hard copy of this report.

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SUMMARY COMMENTS

The four samples described in this report from polished thin sections are from two drillholes: STO1 at 35.3m, 80.6m and 90.55m and STO2 at 31.4m.

These samples include unusually magnetite-rich serpentinites in STO1 at 35.3m and 90.55m, with 5-7% arsenopyrite at 90.55m. Bands with unusually pale (essentially colourless) phlogopite as well as serpentine occur in STO2 at 31.4m and in STO1 at 80.6m, together with abundant sulphide. Because of the uncertain optical identification of the colourless (probable) phlogopite in STO2, 31.4m, this mineral was analysed by XRD (at AMDEL) which in fact confirmed phlogopite, together with lizardite (serpentine) and fluorite.

The sulphide in STO1, 80.6m is mostly pyrrhotite with lesser arsenopyrite and very minor low-temperature pyrite. Sulphide in the sample from STO2 includes abundant low-temperature pyrite ± supergene carbonate ± limonite as well as arsenopyrite and sparse chalcopyrite. These samples show no obvious evidence of Ni, Cr or other metals, apart from Fe, which is unusual for serpentinites of ultramafic origin. Selected geochemistry may be useful to further evaluate the origin of these serpentinites and the phlogopite-rich lenses. The locally abundant fluorite in ST02, 31.4m occurs in a possible open space filling and is accompanied by coarse-grained sulphides protruding into what may be a vein or vug, and seems to be of low-temperature hydrothermal origin. Fluorite is not a mineral expected in serpentinite.

The X-ray diffraction analysis data for sample STO2-31.4m is appended and shows dominant phlogopite with less abundant lizardite and fluorite. The material analysed was taken from a zone of coarse mica between serpentine and fluorite zones in the core-segment.

INDIVIDUAL DESCRIPTIONS

STO1, 35.3m **Serpentine with magnetite in lenses and disseminated and serpentine-clay-limonite-filled fractures.**

Hand Specimen

The hand specimen has dark green serpentinite with abundant magnetite. The thin section shows irregular lenses of magnetite between yellowish and colourless serpentine.

Thin Section

The yellowish serpentine is fine-grained, largely decussate and has sparse disseminated magnetite. There is an irregular contact with colourless serpentine with more abundant microspherulitic, fan-like and garbenschiefer-like aggregates, some of which occur as rims on millimetre to centimetre-scale lenses of apparently granular magnetite, mostly on or adjacent to the contact with yellow serpentine. Fine-grained magnetite is also disseminated. Serpentine-filled fractures in the yellow serpentine pass into clay-limonite-filled fractures in the pale serpentine.

STO1, 80.6m **Serpentinite passing into zones of coarse phlogopite with pyrrhotite, arsenopyrite and rare low-temperature pyrite.**

Hand Specimen

The core has veined serpentinite with banding adjacent to veins of possible pyrrhotite. The thin section has two sulphide lenses with large crystals at a high angle to the lenses or veins.

Thin Section

A small area of serpentine on the edge of the thin section seems to have replaced a granular micromosaic with a grainsize of about 0.5mm. This passes into a zone with increasingly abundant, increasingly coarse essentially colourless phlogopite to 2mm in size adjacent to one of two lenses or veins of sulphide. The phlogopite could not be initially identified positively by optical microscopy, but the same mineral in STO2, 31.4m was confirmed by XRD. The second sulphide lens in set in finer-grained possible phlogopite and has alternating lamellae of sulphide and phlogopite. The larger lens has a base of deformed coarse-grained pyrrhotite with about 40% arsenopyrite as irregular partly large grains and aggregates. Small patches of partly colloform and microporous pyrite occur in and adjacent to the pyrrhotite. The smaller, laminated lens is mostly granular pyrrhotite with small irregular patches of arsenopyrite.

STO1, 90.55m **Partly foliated serpentinite with abundant magnetite and minor arsenopyrite.**

Hand Specimen

This is a magnetite-serpentine aggregate with minor sulphide. The thin section has minor arsenopyrite scattered through magnetite and serpentine.

Thin Section

This sample has possibly 35% magnetite, partly microcrystalline and partly in aggregates to 5mm long, in partly foliated serpentinite with lamellae of serpentine in an anastomosing foliation and other lamellae at a high angle to the main foliation. Some of the magnetite is in parallel lamellae but most is disseminated and in irregular aggregates. Arsenopyrite is also fine to coarse-grained with grains and aggregates to 5mm long and seems to make up 5-7% of the thin section by volume.

STO2, 31.4m **Serpentinite with clays, carbonate and limonite passing into a banded serpentine-phlogopite-sulphide zone with sulphides, magnetite carbonate, and locally abundant coarse pale green fluorite, in a possible infill vein. The sulphides are low-temperature pyrite, arsenopyrite and chalcopyrite.**

Hand Specimen

The core-segment is strongly banded with a band of serpentine passing into brownish clay or limonite-rich bands and semi-massive sulphide and a zone of pale green mineral that is moderately soft and may be apatite or fluorite. The thin section has semi-massive sulphide in a band 12-24mm wide between possible serpentine and clay/limonite bands and the pale green material.

Thin Section

This sample is banded with bands as follows.

1. A band of serpentine possibly derived from former decussate amphibole, with lenses rich in brown clays, commonly in the centres of serpentine aggregates, small aggregates of sulphide and magnetite and sparsely disseminated grains of carbonate: this band is at least 6mm wide and extends to the edge of the thin section. The magnetite is quite ragged and similar to secondary magnetite in other serpentinites, with less abundant pyrite as ragged small patches and limonite intergrown with carbonate.
2. This is followed by a lenticular band from 2mm to 4mm wide, dominated by brown limonite-stained clays but with minor carbonate and serpentine disseminated and in lenses partly along the inner edge of this layer. Very minor magnetite occurs in a lens on the outer margin of the layer, close to rare pyrite. The clays seem to have replaced a mineral with a decussate texture and may represent more complete alteration of the serpentine, similar to that seen in band #1.
3. Lenticular layers follow, with zones of carbonate mostly from 0.2mm to 3mm wide passing into yellowish stained serpentine and clay (smectite?). These layers lack sulphide but there is a narrow carbonate vein along the inner margin with small lenses of chalcopyrite.

4. The adjacent band is quite irregular and from 2mm to 6mm wide, and is composed of lamellae of variously decussate, fibrous and colloform-banded serpentine with sparse lamellae of more highly birefringent phyllosilicate, possibly talc or phlogopite. A large lens of sulphide, serpentine and carbonate is present, apparently related to the sulphide-rich zones in this sample. This lens is 6 x 4mm, and is composed of granular, microporous and fibrous/cellular low-temperature pyrite. There is another large lens, 10mm long and as much as 6mm wide, with mostly lamellar, microporous low-temperature pyrite and lamellae pyrite as blocks intergrown with possibly supergene carbonate and as well as serpentine.
5. Highly irregular lenses of sulphide characterise the adjacent layer: these are commonly armoured by plates of very pale green phlogopite, but in places is rimmed by microcrystalline or colloform-banded serpentine ± phlogopite, with sparse possibly supergene carbonate in and adjacent to the sulphide. The sulphide lenses and crystals are from 0.4mm to 6mm wide, locally projecting into the following zone, which seems to represent space-filling material and is lined by a zone of fan-like aggregates of phlogopite to 1mm in grainsize, except where euhedral sulphide faces into the zone. Much or the sulphide is lamellar, microgranular and microporous low-temperature pyrite with irregular masses of arsenopyrite to 2mm long and sparse chalcopyrite. One mass protruding into the next zone is largely a single crystal of arsenopyrite 6mm long with inclusions of low-temperature pyrite and chalcopyrite and fractures filled by fluorite. The other has abundant low-temperature pyrite as well as large masses of arsenopyrite and has been cut by fractures filled with fluorite and chalcopyrite.
6. The final zone is composed of coarse-grained fluorite with thin films of calcite along octahedral cleavage planes and irregular fractures. This zone is at least 15mm wide and seems most likely to be a vein filling an open vug or fracture.

The low-temperature pyrite in this sample is of supergene origin and has probably replaced pyrrhotite. The possible phlogopite has been confirmed by X-ray diffraction analysis as it is colourless and would seem to have little or no iron.

MINERALOGY OF SAMPLE ST02-31.4 (by AMDEL)

1. INTRODUCTION

A sample was received from Ian Pontifex of Pontifex & Associates with a request for determination of its mineralogy.

2. PROCEDURE

The sample was pulverised then analysed by X-ray diffraction to identify the minerals present.

3. RESULTS

The semi-quantitative mineralogy of the sample follows.

Phlogopite	D
Lizardite	Tr-A
Fluorite	Tr-A

Semiquantitative Abbreviations

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.
A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.
Tr = Trace. Components judged to be below about 5%.