

**PETROGRAPHIC REPORT ON A SAMPLE OF DRILL CORE
OF INTENSELY ALTERED ROCK FROM WESTERN
TASMANIA**

For

Andrew Habets, on behalf of
Saracen Mineral Holdings Limited

Reference: Memorandum dated March 6, 2006

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March, 2006

SUMMARY

A small sample of diamond drill core, labelled 133935, from the Central Volcanic Complex in western Tasmania, was submitted for petrographic preparation, description and interpretation. Information on the mineralisation, alteration and rock type was sought. A polished thin section of the sample was prepared and this was subsequently examined microscopically in transmitted and reflected light. The sample offcut was measured for magnetic susceptibility (extremely low) and it was tested with dilute HCl to check carbonate speciation.

A summary description of the sample is:

133935 PTS

Summary: Fine to medium grained schist, with moderate foliation and composed of dominant carbonate (dolomite), sericite-fuchsite and quartz, with minor disseminated pyrite and chlorite, and traces of rutile, chromite, galena, sphalerite and chalcopyrite. A few irregular syn-tectonic carbonate veins irregularly cut the foliation. The rock may represent a former porphyritic volcanic rock (or epiclastic) of andesitic to mafic composition. There is an analogy between the composition of the rock and some of the host rocks to the Hellyer massive sulphide deposit.

It is interpreted that the sample represents a former volcanic or epiclastic rock, perhaps originally containing larger (e.g. phenocrystal) grains of feldspar. There is little evidence of former phenocrystal grains of quartz, but on the other hand, traces of relict fine grained chromite are sparsely scattered. These characteristics suggest that the original volcanic rock was not felsic in composition, but more likely andesitic to basaltic. Some porphyritic andesitic to mafic volcanic rocks contain traces of chromite, e.g. as tiny inclusions in original igneous clinopyroxene phenocrysts. The original rock has undergone strong deformation and hydrothermal alteration effects, with the latter being pre- or syn-tectonic. There has been almost complete replacement and recrystallisation of the original rock and primary textures are largely destroyed. The rock is now composed of a fine to medium grained, moderately foliated assemblage of carbonate (dolomitic), sericite-fuchsite and quartz, with minor pyrite and chlorite and traces of rutile, chromite, galena, sphalerite and chalcopyrite. The presence of chromite has probably allowed reaction during alteration and deformation to produce fuchsite (Cr-muscovite). It is possible that there was minor syn-tectonic veining by carbonate. Foliation is defined by preferred orientation of sericite-fuchsite and carbonate aggregates. The presence of sulphides implies that along with introduction of water and CO₂ into the protolith, that there was also introduction of S and traces of base metals.

The alteration assemblage in the rock poses some similarity to the host rocks enclosing the Hellyer massive sulphide deposit.

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Handspecimen: The drill core sample is composed of a pale yellowish-grey and locally green coloured, fine to medium grained, moderately foliated schist. It is probably rich in sericite and quartz, although the rather bright apple green colour evident on some foliation planes is likely to be due to fuchsite (Cr-muscovite). The rock displays streaks of white carbonate elongate in the plane of the foliation and testing of the section offcut with dilute HCl showed that the carbonate reacted slowly, suggesting that it could be dolomite. The sample has a few deformed porphyroblastic aggregates (?chlorite) up to 2 mm across and a minor amount of pyrite is irregularly disseminated throughout, forming grains up to 1 mm across. The sample is essentially non-magnetic, with susceptibility $<10 \times 10^{-5}$ SI units.

Petrographic Section:

a) Primary mineralogy and textures: In the section, it is apparent that the sample is a fine to medium grained, moderately foliated schist. It is possible that there are poorly preserved relict textures. The rock contains a few pseudomorphs after possible former phenocrystal grains of feldspar up to 1.5 mm across around which foliation wraps. There are also rare tiny relict grains of chromite, enclosed within foliae rich in fuchsite. The relict textures are not diagnostic, but it is speculated that the original rock could have been porphyritic and may have been volcanic (lava, pyroclastic) or epiclastic.

b) Alteration and structure: The original rock has undergone strong deformation, pre- or syn-deformational hydrothermal alteration and almost complete recrystallisation and replacement of primary components. Possible former feldspar phenocrysts have been replaced by fine to medium grained sericite (and possible ?talc), with minor carbonate and chlorite. The remainder of the rock is moderately foliated, generally fine grained (mostly <0.2 mm), with schlieren (foliae) of colourless to pale green mica (sericite, grading to fuchsite) up to 0.5 mm wide intercalated with somewhat wider schlieren rich in carbonate ($\pm$ sericite, quartz, chlorite) and with uncommon schlieren richer in quartz ($\pm$ carbonate, sericite). Traces of fine grained relict chromite up to 0.5 mm across are associated with fuchsite and there is also a trace of fine grained rutile dispersed throughout. Minor pyrite occurs as disseminated subhedra up to 0.6 mm across irregularly throughout the sample and tiny traces of galena, sphalerite and chalcopyrite (in places as tiny composites) occur in the carbonate-rich zones. Foliation in the rock is defined by preferred orientation of sericite-fuchsite and by elongation of carbonate- and quartz-rich aggregates. There are also a few small "pressure shadows" of fibre quartz and sericite developed about porphyroblastic grains of pyrite. Uncommon syn-tectonic veins of turbid carbonate up to 1 mm wide tend to cross-cut the foliation and appear to have been boudinaged.

c) Mineragraphy and paragenesis: The sample contains minor pyrite subhedra as porphyroblasts up to 0.6 mm across, irregularly disseminated throughout. Tiny traces of galena, sphalerite and chalcopyrite occurs discretely and as composites (locally with pyrite) in carbonate-rich zones. There is also a trace of fine grained rutile and relict chromite.

Mineral Mode: Approximate modal proportions are: carbonate (dolomite) 50%, sericite-fuchsite (and possible talc) 30%, quartz 15%, chlorite and pyrite each 2% and traces of rutile, chromite, galena, sphalerite and chalcopyrite.

Interpretation and Comments: It is interpreted that the sample represents a strongly deformed and hydrothermally altered former porphyritic volcanic rock or epiclastic. It may

have contained a few phenocrystal grains of feldspar. The presence of traces of fine grained relict chromite implies that the original rock was relatively mafic (e.g. andesite, basalt, with chlorite perhaps occurring originally as tiny inclusions in an igneous phase such as clinopyroxene). The rock underwent pre-or syn-tectonic alteration to carbonate, sericite-fuchsite and quartz, with minor pyrite and chlorite. There was evident large introduction of CO₂ and water into the rock, along with minor S. Tiny traces of galena, sphalerite and chalcopyrite in the sample also imply local mobility of base metals. The alteration assemblage in the sample is analogous to some of the altered volcanic rocks that are host to the Hellyer massive sulphide deposit.