MINERALOGICAL REPORT No. 9562

by Alan C. Purvis, PhD

June 30th, 2009

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

YOUR REFERENCE : Your email 10/6/09

MATERIAL & IDENTIFICATION : Five rock samples
                           HRRC-047, 057, 075, 079, 081

WORK REQUESTED : Section preparation, petrographic/mineragraphic description.

SAMPLES & SECTIONS : Returned to you with this report.

DIGITAL COPY : Emailed 30/6/09 to:
                jimn@mithrilresources.com.au

PONTIFEX & ASSOCIATES PTY. LTD.
SUMMARY COMMENTS

Five samples described in this report from polished thin sections are from various Mithril prospects in mafic and ultramafic rocks in the Northern Territory. The petrology indicates three with orthopyroxene and hornblende as the main components classified as norite and bronzitite, one troctolite rich in largely fresh olivine and with the most abundant (albeit minor) sulphide, and one clinopyroxenite as an aggregate of clinopyroxene with minor hornblende, sparse fine chrome spinel, trace sulphide. Selected photomicrographs illustrate various aspects of the petrography and sulphides.

The orthopyroxene-rich rocks include metamorphosed norites (HRRC-057 and HRRC-075) HRRC-057 is laminated with lamellae of orthopyroxene and hornblende as well as lamellae of fine-grained recrystallised plagioclase. Very minor hercynite occurs and there is rare sulphide (pyrite and chalcopyrite).

The clinopyroxenite (HRRC-047) has minor hornblende and chrome spinel as well as chalcopyrite, pyrite and possibly gossanous limonite. This may represent a tholeiitic or transitional subalkaline to alkaline magma type with copper mineralisation rather than nickel.
INDIVIDUAL DESCRIPTIONS

HRRC-047

Fine to medium-grained clinopyroxenite with minor hornblende and very minor chrome spinel. Rare chalcopyrite partly rimmed by covellite, trace pyrite and limonite after pyrite.

Field Note: Subcrop of medium to coarse-grained gabbro with disseminated sulphides to 1mm and pyroxene to 5mm (844ppm Cu; 722ppm Ni; 0.03%S)

This sample is mostly inequigranular clinopyroxene, calculated from the assay data as Wo$_{35}$En$_{53}$Fs$_{12}$ with Na, Al, Ti, Cr and possibly some Ni as minor and trace elements. The clinopyroxene is inequigranular, from 0.2mm to 4mm in grainsize. Very minor (2-3%) pale yellow-green hornblende is disseminated as well as opaque grains and limonite-filled fractures. There is also very minor microcrystalline chrome spinel and small grains of chalcopyrite rimmed by covellite and clays (~0.2%). Rare microcrystalline chalcopyrite is enclosed in clinopyroxene indicating a magmatic origin. Rare pyrite is disseminated and there are patches of limonite. Some of the nickel may be in limonite after sulphide.
Figs 1 & 2

HRRC-047

Thin section (TS). Fig 1: Polarised plane light (PPL). Fig 2: Crossed nicols (Xnic). Magnification (x50). Massive granular clinopyroxene with lesser scattered pale green hornblende and sparse extremely fine black-opaque oxide (chrome spinel); cut by limonite-filled micro-fractures.
Fig 3  
**HRRC-047**

Polished thin section (PTS). Reflected plane light (RPL). (x100) Minor chalcopyrite partly rimmed by blue supergene covellite and limonitic clay (larger patch to the left-hand side).
HRRC-057  Laminated hornblende-orthopyroxene-plagioclase-(spinel) aggregate with trace pyrite, pyrrhotite and chalcopyrite. Interpreted as a metamorphosed mafic probable augite norite.

Field Note:  Unit of undeformed melagabbro within foliated gabbro; occasional pitting evident but no sulphides (Cu: 54ppm; Ni: 351ppm; S: 0.02%)

This sample is irregularly laminated with lenses and lamellae rich in fine-grained plagioclase alternating with lamellae of hornblende and orthopyroxene. The visually estimated mineralogy includes 39% hornblende, 35% orthopyroxene, 25-26% plagioclase and 0.5% accessories. The orthopyroxene is pleochroic from very pale green to pale pink and is inequigranular with grains to 6mm long parallel to the layering. Pale green hornblende forms a mosaic to 1mm in grainsize with plagioclase as a micromosaic about 0.4mm in grainsize. Accessories include deep green probable hercynite and partly limonitised sulphides (minor pyrrhotite ± pyrite as well as rare chalcopyrite). The hornblende may represent olivine, clinopyroxene and plagioclase in the original rock, suggesting metamorphosed mafic augite norite or olivine norite. The assay suggests potassium-rich amphibole in this sample.
Fig 4

HRRC-057

TS. PPL. (x20). Meta-augite-norite, with granular orthopyroxene and green hornblende (high relief) in layers or lamellae alternating with plagioclase-rich lamellae.

---

Fig 5

HRRC-057

PTS. RPL. Minor partly limonitised composite sulphide grains of yellow chalcopyrite and lamellar, pale pinkish pyrrhotite. Minor small white pyrite grains in these composites and scattered separately.