

MINERALOGICAL REPORT No. 8600
by Alan C. Purvis, PhD.

November 19th, 2004

TO: Mr David (Rowdy) Rawlings
Cameco Australia Pty Ltd
PO Box 35921
WINNELLIE NT 0821

YOUR REFERENCE: Order No. 3494 (part)

MATERIAL: Drill Core samples (6); only one sample is from
Kukalak (DJR Jan05)

IDENTIFICATION: KLD103-1888

WORK REQUESTED: Polished thin and thin section preparation,
description and report.

SAMPLES & SECTIONS: Temporarily retained.

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SUMMARY COMMENTS

This report describes one drill core sample from Arnhem Land in the Northern Territory, using one polished thin section. The offcuts were stained with HF and sodium cobaltinitrite to show K-spar with a deep yellow colour. This work is covered by Order No. 3494, which also includes the preparation only of numerous other thin and polished thin sections.

This sample is an altered granitoid with sericite, quartz, chlorite, clays, leucoxene and limonite or earthy hematite, locally accompanied by accessory sulphide. Uranium minerals were not detected by the optical microscopy. Some idea of the abundance of uranium may assist in deciding on an approach to identify possible uranium minerals in these samples as a follow-up to this report e.g. SEM or microprobe analyses, or autoradiographs. Checking with a scintillometer suggests some activity in the sample from KLD103, with trace small grey crystals.

Table 1 below tabulates the field notes and provides some additional notes on the petrology.

Table 1: Samples described in Report No. 8600

Sample	Notes and queries	Summary description
KLD103-1888	<i>Uranium-bearing vein: what are the U-bearing and associated minerals?</i>	Muscovite-syenogranite with advanced sericite alteration. Abundant granophyre suggesting partial remelting.

INDIVIDUAL DESCRIPTIONS

**KLD103, 1888
PTS** **Muscovite-syenogranite with advanced alteration to sericite. Abundant granophyre, suggesting partial remelting. [No uranium minerals detected.]**

Field Note: *Uranium-bearing vein: what are the U-bearing and associated minerals?*

Hand Specimen

This sample seems to be a quartz-rich granitoid with abundant K-spar, as seen on the stained outcut, with irregular, largely lobate lenses of quartz.

Thin Section

This sample has perhaps 40% quartz, 4% altered plagioclase and 6% muscovite as well as K-spar and granophyre. Much of the quartz is lobate or interstitial with grains to 4 or 5mm long between areas of K-spar and granophyre. There are also masses of inequigranular but mostly fine-grained recrystallised quartz with patches of muscovite partly interstitial to euhedral quartz. Small euhedral plagioclase laths, about 1mm long, have been altered to massive sericite and sericite is also abundant throughout areas of K-spar and granophyre. The K-spar is commonly reddish, and there is abundant granophyre, partly rimming the quartz grains, suggesting that the granite has been partly remelted, although this is not certain. Similar textures have been seen where granite has been intruded or engulfed by gabbro.

Rare opaque small grey crystals occur, surrounded by clay and mostly enclosed in quartz. These may represent limonite after pyrite or a uranium mineral such as uraninite.

MINERALOGICAL REPORT No. 8572
by Alan C. Purvis, PhD & R. Pontifex MSc.

October 26th, 2004

TO: Dr David (Rowdy) Rawlings
Cameco Australia Pty Ltd
PO Box 35921
WINNELLIE NT 0821

YOUR REFERENCE: Order No. 3569

MATERIAL: Drill Core Samples (4); only one sample is from
Kukalak (DJR Jan05)

IDENTIFICATION: KLD017-3189

WORK REQUESTED: Polished thin and thin section preparation,
description and report.

SAMPLES & SECTIONS: Returned to you with this report.

PONTIFEX & ASSOCIATES PTY. LTD.

SUMMARY COMMENTS

One sample of drill core is described in this report using one polished thin section, as requested on covering Order Number 3569 (together with another 58 samples for section preparation only).

Sample KLD017, 3189 is a quartz-biotite-garnet-sillimanite gneiss, with a layer-parallel quartz vein, apparently a high grade metapelite. It has been retrogressed, with no residual sillimanite and veins of chlorite and sericite in the garnet. This KLD017 sample contains 1-2% graphite, and trace chalcopyrite.

INDIVIDUAL DESCRIPTIONS

KLD017, 3189 **Partly retrogressed quartz-biotite-garnet-sillimanite gneiss, with abundant sericite and less abundant chlorite (mostly replacing garnet). Accessory graphite (1-2%), trace finer chalcopyrite.**

Field Note : *Is there graphite in this rock?*

The estimated modal mineralogy of this thin section is: 30% garnet, 25% biotite, 15% sericite and 30% quartz, (largely in a layer-parallel vein). This rock is petrographically identified as a partly retrogressed pelitic gneiss with a boudinaged quartz-rich layer or layer-parallel vein 4-8mm wide. The vein consists of largely coarse-grained quartz but contains lenses of sericitised feldspar, fine-grained recrystallised quartz and partly clay or chlorite-altered muscovite, locally with hematite parallel to the cleavage.

The host rock has an anastomosing foliation with lenticular foliae to 8mm wide, composed of schistose biotite and interstitial sericite, separating narrow quartz-rich lenses and large lenticular grains of garnet. The garnet grains measure up to 15mm long and 6-8mm wide, with inclusions of quartz and biotite. Most of the biotite inclusions in garnet are parallel to the matrix schistosity, but the quartz is unoriented. The garnet is fractured and fragmented with alteration to chlorite and veining by sericite. Some of the biotite has chlorite and possible clay alteration, with sericite parallel to the cleavage in clay-altered flakes. Interstitial sericite may have replaced feldspar but may also have replaced fibrolitic sillimanite, although this is not clear.

Very small radioactive grains, with pleochroic haloes occur as inclusions in chlorite or biotite. If these are interpreted as inherent detrital grains, then their size suggest an original shale or siltstone as the most likely protolith sediment.

Trace graphite flakes to 0.2mm size are randomly oriented interstitial between silicate minerals. More abundant graphite flakes 0.1mm wide and up to 1mm long occur at irregular intervals aligned along the schistosity, intergrown with schistose micas. Total graphite content is 1 to 2%. Trace chalcopyrite accompanies accessory leucoxene-anatase grains.