

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. 9611

by Alan C. Purvis, PhD

October 30th, 2009

TO : Mr Jason Cherry
Uranium Exploration Australia Ltd
313 Payneham Road
Royston Park SA 5070

YOUR REFERENCE : Five rock samples received 25/09/2009

IDENTIFICATION : Arunta Block N.T: 83044, 45, 46, 51, 57

WORK REQUESTED : Section preparation, description and report.

SAMPLES & SECTIONS : Returned to you with hard copy of this report.

DIGITAL COPY : Emailed 30/10/2009 to:
jcherry@uxa.com.au

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SUMMARY COMMENTS

Five samples described in this report from normal thin sections include 83044-46, 83051, and 83957 from the Arunta Block in the N.T. Summary comments are as follows.

Arunta, N.T.

Sample 83044 is identified as a weathered/altered dolerite, as suggested in your covering notes, characterised by a crystalline aggregate of limonitised plagioclase and quartz-clay-leucoxene-altered pyroxene, accessory scattered grains of leucoxene ex-opaque oxide, also minor interstitial late magmatic and low temperature hydrothermal quartz. Minor limonitised and/or leached pyrite occur mostly in and adjacent to low temperature hydrothermal quartz.

Sample 83045 is a heterogeneous albite-sericite-chlorite-clay-altered micro-monzogranite, passing into less K-feldspar-rich altered microgranodiorite.

Sample 83046 contains abundant fresh primary microcline, and is a sericite-muscovite-chlorite-limonite-altered quartz syenite, with accessory apatite, zircon \pm monazite to 0.4mm long. These ? dykes are indicated as having anomalous Th and/or U contents, but the only evidence of high actinide content is the presence of zircon or monazite in sample 83046. Rare, minute radioactive inclusions occur in silicates.

Sample 83051 is petrographically identified as micromonzogranite, finer-grained than 83045 above, with weak sericite-clay-chlorite alteration, and rare very fine-grained zircon.

Sample 83057 is an unusual rock with the bulk composition of altered monzogranite, but has totally sericitised plagioclase and hematite-stained quartz and K-feldspar apparently of low temperature hydrothermal origin. This sample also contains biotite altered to sericite-hematite-leucoxene, \pm quartz/feldspar-altered, and seems to have been modified by oxidizing fluids.

INDIVIDUAL DESCRIPTIONS

Samples from the Arunta Block, Northern Territory

83044	Weathered probable dolerite, with limonite and clay probably ex-plagioclase, together with fine quartz, clays and anatase replacing ex-pyroxene, accessory leucoxenised opaque oxide. Minor limonitised and/or leached pyrite, and interstitial late magmatic and low temperature hydrothermal quartz.
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Field Note: *Highly weathered dolerite*

Limonitic clays are seen to replace abundant platy crystals in this rock, mostly less than 1mm long in this thin section. These may have been plagioclase but the clay has a strong cleavage pattern, lenses of quartz parallel to the cleavage and minor possible leucoxene or anatase, allowing the possibility of former biotite. Plagioclase would seem to be more likely, however.

Interstitial material has been altered to fine quartz with disseminated probable anatase and minor clay, suggesting former pyroxene. There is also 5-7% interstitial relicts of late magmatic and low temperature hydrothermal quartz to 0.8mm in size, with rare apatite and 5-7% leucoxenised granular opaque oxide to 0.5mm. Some of the quartz encloses limonitised and/or leached pyrite (mostly limonitised), with a lens of partly prismatic quartz and limonitised and leached pyrite 3mm x 1.5mm. Rare limonite after pyrite also disseminated. There are also abundant limonite-filled fractures.

This sample is interpreted as weathered dolerite consistent with your field note, but the presence of plagioclase and/or biotite cannot be proved from this thin section.

83045	Micro-monzogranite apparent dyke-rock, altered to albite-sericite-chlorite-clay, passing into microgranodiorite.
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Field Note: *Fine-grained dykes within megacrystic granite (Southwark Granite Suite, Arunta Block) with sporadic entrained K-feldspar megacrysts. Dykes return high assays of either thorium (up to 300 ppm) or uranium (400-500ppm).*

Part of this thin section is occupied by fine-grained monzogranite with subequal amounts of quartz, albite-sericite-clouded plagioclase and microcline as well as minor weakly oriented biotite, with clay or chlorite alteration, and unoriented muscovite, possibly of subsolidus origin. This material is less than 0.8mm in grainsize but has rare quartz from 1mm to 1.5mm in diameter, possibly microphenocrysts.

This passes into a coarser-grained rock with crystals 0.3mm to 1.3mm in diameter, including 40% quartz, abundant clay-sericite-clouded albitised plagioclase, minor microcrystalline, altered biotite, and possibly secondary muscovite. Rare patches of clay and/or pumpellyite occur locally. This composition represents fine-grained granodiorite. Rare minute radioactive grains in altered biotite locally have pleochroic haloes.

83046	Quartz-Syenite, altered to sericite-muscovite-chlorite-limonite, with accessory apatite, zircon ± monazite. Possible metamict allanite.
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Field Note: *Fine-grained dykes within megacrystic granite (Southwark Granite Suite, Arunta Block) with sporadic entrained K-feldspar megacrysts. Dykes return high assays of either thorium (up to 300 ppm) or uranium (400-500ppm).*

This sample is coarse-grained compared to 83045, and has a visually estimated mineralogy of 56% microcline, 16-17% quartz, 20.5% sericite-muscovite-albite-hematite-altered plagioclase, 6-7% weakly clay-chlorite-altered biotite + epidote, <1% opaque oxide and accessories (apatite and zircon or monazite).

The abundant microcline crystals are to 4mm long, are abundant and accompanied by mostly altered anhedral plagioclase and relatively minor interstitial quartz, (indicating quartz syenite). Scattered biotite ± epidote mostly occur as ragged flakes and aggregate, locally microcrystalline. Accessory zircon and/or monazite are mostly less than 0.2mm in size, rarely 0.4mm, and are accompanied by apatite. There may be rare metamict allanite but this is uncertain.

83051	Weakly altered, sparsely quartz-feldspar porphyritic micromonzogranite, with sericite, clays and chlorite.
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Field Note: *Groundmass appears to comprise mica, feldspar and quartz with sporadic feldspar phenocrysts or megacrysts and rounded quartz phenocrysts in a fine groundmass: possibly miarolitic textures also present in outcrop.*

This sample is grey or cream in hand-specimen without any obvious microlitic cavities. The thin section has rare sericite-clouded rounded plagioclase phenocrysts and aggregates to 2mm in diameter, rare quartz phenocrysts about 2mm in diameter and aggregates rich in quartz and biotite, locally with muscovite, plagioclase and opaque oxide. Much of the rock is fine-grained with quartz and plagioclase more abundant than K-feldspar and biotite and muscovite. The quartz commonly occurs in anastomosing zones containing minor K-feldspar, biotite and muscovite but poor in plagioclase, with grains about 0.25mm in diameter, compared to 0.1mm grain size in plagioclase-rich areas. Accessories are rare, and include opaque oxide, apatite and very fine zircon. The plagioclase has weak sericite alteration with clay-chlorite in biotite.

This sample is identified as micromonzogranite, with weak alteration to sericite and clay or chlorite.

83057	Altered probable monzogranite, with sericitised plagioclase, sericite-leucoxene ± hematite ex-biotite. Abundant quartz and reddish K-feldspar have low temperature hydrothermal characteristics.
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Field Note: *Groundmass appears to comprise mica, feldspar and quartz with sporadic feldspar phenocrysts or megacrysts and rounded quartz phenocrysts in a fine groundmass: possibly miarolitic textures also present in outcrop.*

This sample is pink in hand specimen and has been largely flooded by earthy hematite or limonite. It has probable quartz phenocrysts to 5mm in diameter overprinted by roughly prismatic low temperature hydrothermal quartz and reddish K-feldspar to 4 or 5mm long. There is also abundant fine-grained reddish K-feldspar and totally sericitised probable plagioclase as well as apparently low temperature hydrothermal quartz with cryptocrystalline possible hematite in lenses roughly parallel to their c-axes and weak undulose extinction. These three minerals occur in subequal proportions. Relatively coarse-grained biotite to 4mm long has been altered to sericite, hematite and leucoxene and has lenses of quartz and/or feldspar parallel to the cleavage, but fine-grained biotite is mostly flooded by hematite and leucoxene. Muscovite is very minor as ragged grains.

Interpretation:

This sample may represent monzogranite but the plagioclase and biotite have been altered to sericite-rich aggregates and the quartz and K-feldspar seem to be low temperature hydrothermal varieties, possibly derived from primary igneous material but clouded by earthy hematite.