

MINERALOGICAL REPORT No. 8271
by Ian R. Pontifex MSc.

October 17th, 2002

TO : Mr Peter Simpson
Giant's Reef Mining Limited
PO Box 1244
TENNANT CREEK NT 0861

YOUR REFERENCE : Order No. 200953

**MATERIAL &
IDENTIFICATION :** RC drill chip samples, Bluebush Project area
Numbers 71676, 677, 678, 679

WORK REQUESTED : Thin section preparation, description and report
with comments and interpretations as specified.

SAMPLES & SECTIONS : Returned to you with this report.

DIGITAL COPY : Enclosed with hard copy of this report.

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SUMMARY COMMENTS

Four samples of small drill chips from EL8882 are petrographically described in this report form thin section of the chips initially mounted in epoxy. Field data provided is :

Sample No.	Location	Co-ordinates AGD84	Condensed notes
71676	EL 8882 BBRC008 59-60m	372200E 7824500N	Probably decayed gabbroic rock
71676	EL 8882 BBRC020 73-74m	385995 7819696N	Possibly a dolomite
71678	EL 8882 BBRC021 64-66m	367996E 7820011N	Looks like a sheared ferruginous sediment
71679	EL 8882 BBRC021 105-106m	367996E 7820011N	Red gabbro or diorite

A summary of petrographic rock name with comments on alteration and genesis is provided as a header to each description, and comments relating to your field notes are included generally at the end of each description. The samples are sufficiently different to negate a composite suite summary, although 71678 is conceivably a strongly sheared (protomylonitic) equivalent of the relatively less tectonised (biotite)-tonalite sample 71679 (as questioned in your notes).

71676

- 35-40% chips of intensely weathered (undeformed) plagioclase-rich gabbro, with accessory apatite and opaque oxides.
- 60-65% chips of “secondary” micritic and microsparry to clustered microprismatic carbonate (calcite) rock, with lesser associated quartz, and enclosing fragments of the altered gabbro. This carbonate may be supergene at the top of the gabbro, or it may be low-temperature hydrothermal.

The numerous (80-100) drill chips, all <5mm, mounted for this thin section, have basically three compositions, as predicted in your field notes, in the following approximate proportions:

	Approx. vol. % of whole sample
* Massive, coarse crystalline, undeformed plutonic-igneous rock, composed of co-dominant, altered plagioclase and altered mafic minerals including original biotite or phlogopite, with accessory scattered opaque oxide grains. These represent the “gabbro” mentioned in your field notes.	35-40%
* Massive to weakly layered and zoned micritic carbonate incorporating minor scattered chlorite/chloritic-clays with accessory ‘secondary’ quartz, residuals of apatite and opaque oxide. Composite with poorly defined patches and layer veins and apparent breccia cement of microsparry carbonate. Rarer (vein) quartz, some with vague microcolloform textures.	30-40%
* Independent chips of the microsparry and clusters of random prisms of calcite, ± (lesser) vein quartz, liberated from the composite calcite rock above.	15%

The 'gabbroic' chips commonly contain coarse former euhedral crystals of pyroxene and/or amphibole after pyroxene, almost completely altered to limonite-stained smectitic clays, together with slightly less-altered plagioclase, albeit densely clouded by clay-sericite. Equally coarse original micas (?biotite or phlogopite) are randomly intergrown in some chips (in fact, dominate some chips) and these are completely altered to smectite clays (which rapidly swell when wet). Original opaque oxide grains to 1mm size, are secondarily oxidised, and fewer primary apatite crystals occur in some chips. These chips have an undeformed, primary coarse crystalline plutonic/igneous texture ie. without any metamorphic fabric. The relative abundance of original plagioclase and mafic crystals, with accessory original magnetite and apatite and nil quartz, more or less confirms a primary gabbro (albeit unusually rich in mica).

It is of interest that many of the carbonate chips, incorporate small fragments of the intensely weathered gabbroic rock, including fragments of altered plagioclase, mafic crystals and micas, and rarely the accessory resistate opaque oxide and apatite grains.

The simplest genetic interpretation of the above seems to be a basement of altered 'gabbro' possibly as a palaeo-weathered surface overlain by supergene calcite-rich rock ('calcrete') which partly infiltrates this basement. Objectively the various textures within the carbonate and the minor accompanying secondary quartz, suggests an 'active' supergene accumulation of possible calcrete or indeed, possibly it has a low temperature-hydrothermal (?epithermal) genesis, in which case its relationship to the gabbro is less certain.

Chips of massive microcrystalline (including microsparry) dolomite (dolostone). One chip of cryptocrystalline silica with small scattered siliceous ‘fragments’ which may be unusual shards, (in a devitrified glassy tuff?) or which may be microfossils (in a chert?)

These chips are entirely different from the carbonate (calcrete/limestone)-rich chips in sample 71676 and there is no petrographic reason therefore to (geologically) relate the carbonate chips in these two samples.

One chip in this sample to 10mm across, is quite different, being composed of massive micro to cryptocrystalline quartz, clouded by opaque (or very weakly translucent) dust, defining a vague possible micro-ignimbritic texture. In addition, there are minor (3%) scattered siliceous “curved spicules”, about 0.02mm wide to 0.8mm long, which could be unusual shards, or fossil fragments. There are also ovoid to irregularly circular “bodies” (7-10%) of cryptocrystalline apparent clay-chlorite-chalcedony, some internally microscopically cellular, which may be microfossils (of unknown classification). This siliceous chip may therefore represent a “fossiliferous chert” (perhaps, rather than a devitrified glassy tuff?) This chip does not show any metamorphic deformation.

**71678 Proto-mylonitic. partly granulose schist, of co-dominant quartz sericitised plagioclase and minor muscovite, reddened by dusty limonite/hematite oxidation.
[Conceivably a more sheared and reconstituted equivalent of the 71679 rock type with former biotite altered to muscovite.]**

These chips have a reddish-brown colouration due to widespread permeation of limonitic ± hematite dust oxidation. The gross texture is fine to medium grained, tectonically layered and schistose, including local tectonic distortion, elongation-shear fabric, and mylonitic quartz, variably in different chips. In the sample as a whole, the chips consist of co-dominant quartz and sericitised ex-plagioclase, together with minor scattered muscovite.

The quartz is commonly elongate recrystallised (with fabric and in discontinuous incipient veins) but some is granular including finely fragmented. Sericitised plagioclase tends to be more granular, with a size <0.5mm, some within inherited aggregates, some fine brecciated and comminuted with some clay-sericite along schistosity and shears. The micas are variably schistose, and random due to the tectonism.

These chips clearly represent a shear protomylonitic zone. Their gross composition does approximate the mineralogy of the somewhat coarser grained and less tectonised chips in 71679, to the extent that it could very well represent a more sheared and reconstituted equivalent of that 71679 rock type.

71679 Medium grained (biotite-quartz)-diorite or tonalite, moderately sheared with quartz recrystallised, and elongated together with schistose biotite. Plagioclase is partly sericitised and the biotite partly chloritised. No diagnostic accessory minerals.

Macroscopically these chips are seen to have greyish schistose matrix domains incorporating variably minor to co-dominant reddish “spots” of apparent ferruginised plagioclase crystals to 5mm in size.

Petrographically, the chips have a residual medium grained plutonic-igneous texture, albeit with some recrystallisation forming a foliation due to “moderate” shearing, but generally not as severe as in 71678. Original plagioclase crystals (50%) 1mm to rarely 5mm, retain a subhedral to euhedral shape, and some are weakly elongate, and show variable 15% to 30% sericitic alteration, with variable reddening by iron-oxide dust. These are fairly evenly disposed through a moderately foliated matrix of finer quartz mosaic (35%) which has recrystallised from earlier granulose quartz, and which incorporates lesser schistose biotite, incipiently chloritised (10-15%). There are no diagnostic accessory minerals although trace small grains of leucoxenised opaque oxides are present.

In some chips, the recrystallised quartz approaches a protomylonitic fabric, indicating localised higher shear, (but not as widespread as in 71678).

This rock is classified as a moderately sheared and recrystallised (biotite) quartz-diorite, or tonalite. It is quite different from the chips of original undeformed-gabbro in 71676