APPENDIX 1

PETROLOGICAL DESCRIPTIONS

INDIVIDUAL DESCRIPTIONS

484996
15689.5E, 10000N

Weathered muscovite-biotite-quartz schist, derived from interbedded siltstone and claystone. Narrow veins (quartz ± clays). Limonite possibly after pyrite.

Weathering has produced sericite and ?smectites after fine schistose muscovite and biotite, which originally dominated this rock. Small quartz-sericite patches may have been porphyroblasts, and there are small limonite spots possibly after pyrite. Very small spots of limonite and leucoxene appear to represent detrital oxide grains. Silt sized quartz grains <0.05mm in size, occur sporadically in diffuse layers. There are thin veins of quartz ± clays ± limonite-lined fractures. The original rock contained interbedded siltstone and sandstone.

485003
15698.5E, ?N

Metasiltstone with veins of carbonate >> barite, quartz.

Quartz grains 0.03 to 0.1mm in size, (silt to very fine sand) are scattered through this sample in a fine schistose sericite matrix, with rare leucoxenised oxides. Abundant veins from 0.5 to 10mm width are present. Most of these veins contain granular fresh to limonite-stained carbonate, possibly calcite + siderite, but one segment, 4 x 1mm, contains fine bladed barite, and a lens of vein quartz 2mm wide is present in the widest vein. These veins could be at least partly of supergene origin.

485029
18365E, 10035.5N

Graphitic sericite-biotite-quartz schist (weathered) with boudinaged quartz veins. Limonite-lined cavities (?after sulphides).

Dense clouds of fine graphite are abundant in this rock, with lenses, layers and patches containing sericite, clay after biotite and quartz. Layer parallel quartz veins with limonite-lined cavities, possibly after sulphide, have been boudinaged and are up to 1mm wide.

485035
18365E, 10041.5N

Metamorphosed hornblende porphyritic calc-alkaline lamprophyre (e.g. spessartite) or mafic andesite.

Weakly schistose green amphibole crystals are the dominant component in this sample, commonly containing possibly primary igneous brown titaniferous cores. Minor schistose biotite is present and there are sericite-dusted microphenocrysts of plagioclase. A fine granular quartzofelspathic mosaic is present enclosing accessory apatite and fine leucoxenised oxide grains. Narrow veins of adularia occur roughly parallel to the foliation, with minor clays and chlorite.

The original rock was probably a calc-alkaline lamprophyre such as a spessartite, or less probably a mafic andesite.

485039
18365E, 10051.5N

Metachert with magnetite (oxidised), apatite and chlorite in lenses and bedding laminations; folded.

A quartz mosaic dominates this rock, which is a metamorphosed impure chert. Lenses and laminations rich in oxidised magnetite are present, locally outlining small but relatively open folds. Also present are lenses and laminations rich in, or composed of, microgranular apatite, also folded. Limonite stained fine chlorite occurs as irregular lenses and shreds.

This sample appears to be related to units within the host unit at The Granites, with folded apatite-rich laminations.

485050
18365E, 10062.5N

Chloritised biotite-felspar-(quartz-?hornblende) gneiss with minor leucoxene and apatite. ?Possibly derived from a diorite.

This sample consists of chlorite, with minor quartz and accessory leucoxene. Traces of fresh fine oxides are present. The textures indicate a former gneiss with biotite and felspar dominant over quartz, and possibly some hornblende, and a grain size of 0.2 to 1mm. Most of the quartz appears to have been recrystallised and some is in layer-parallel veins. There is accessory acicular apatite and the original rock may have been a quartz-bearing diorite.

485095
18365E, 10109.5N

Sparsely porphyroblastic muscovite-biotite-quartz-andalusite schist, adularia veins.

Schistose fine muscovite and biotite dominate this sample, with scattered porphyroblasts of andalusite, to 3mm in diameter, partly altered to fine sericitic clays. The porphyroblasts have highly poikiloblastic cores and relatively euhedral, inclusion-free outer zones.

Quartz is irregularly distributed, from 5 to 50% of various lenticular domains, as grains to 0.1mm in size. Later lenticular veins contain adularia and there are limonite-lined fractures.

The schistosity has been distorted around the porphyroblasts, indicating post-porphyroblast compression.

485105
18365E, 10118.5N

Muscovite-biotite-?andalusite-quartz schist (pelitic) with trace limonite (?after pyrite).

This is a similar schist to that represented by No. 485095, but is richer in muscovite and poorer in quartz (<5% throughout). Also the scattered porphyroblasts, to 4mm maximum diameter, have been totally altered to fine sericite. They appear to have been more skeletal than those in No. 485095, but were probably andalusite. Smaller poikiloblasts of biotite have been altered to probable vermiculite, but the matrix biotite is fresh.

Rare limonitised accessories may have included some pyrite.

The schistosity shows less modification, adjacent to the porphyroblasts than that in 485095.

485109
18190E, 10062.5N

Chlorite-sericite-leucoxene altered felspar-biotite-quartz gneiss or schist with minor oxides; quartz veins with very minor chlorite and limonite after pyrite. ?Dioritic.

This sample shows similarity with No. 485050, but contains sericite as well as quartz, chlorite and leucoxene. It appears to be a retrogressed felspar-biotite-quartz gneiss or schist with 15% quartz (i.e. more than 485050), also more abundant (3%) leucoxenised small oxide grains. Felspar laths to 0.5mm long have been altered mostly to sericite, with chlorite + leucoxene after biotite.

Veins of prismatic quartz to 5mm wide contain very minor chlorite and rare limonite pseudomorphs after skeletal pyrite crystals.

The original rock may have been a quartz diorite.

485116
18190E, 10069.5N

Metamorphosed hornblende porphyritic calc-alkali lamprophyre cr. 485035.

Abundant primary igneous brown hornblende crystals 0.5 to 4mm long, rimmed and partly replaced by pale green metamorphic actinolite, link this rock with No. 485035. Chlorite-leucoxene altered biotite flakes occur in the hornblende, and in thin schistose foliae in the matrix. Partly sericitised plagioclase crystals 1mm in size are scattered in a sparse granular quartzofelspathic groundmass with accessory apatite and minor accessory sphene. Very small patches of limonite may have been derived from pyrite.

This rock was also a calc-alkali lamprophyre (e.g. spessartite) like No. 485035.

485130
18190E, 10084.5N

Metachert with quartz veins containing limonite after sulphides.

This appears to be a metachert with diffuse recrystallised quartz veins. The chert contains traces of impurities - fresh to oxidised opaque grains (2 oxides ± sulphides), sericite, biotite and tourmaline. The vein quartz is mostly free of impurities, but contains lenses of limonite probably derived from granular pyrite, to 4mm wide. Small patches of muscovite and carbonate occur marginal to the limonite.

485136
18190E, 10089.5N

Graphitic chert with trace tourmaline; early quartz veins and late adularia veins. Trace limonite partly after pyrite.

This rock is graphitic, like No. 4485029, but is mostly quartz-rich (i.e. metachert) with minor clays after biotite, and sparse crystals of tourmaline (very pale, probably magnesian). Sparse limonite patches are partly after pyrite but could be partly after garnet.

Disrupted quartz veins occur mostly parallel to the schistosity and there are narrow late veins with adularia ± limonite.

485148
18190E, 10102.5N

Muscovite-quartz-biotite schist with tourmaline and limonite.

Quartz grains from <0.05mm to 0.2mm in size are scattered through this schist, in a matrix with schistose muscovite >> biotite. Patches of limonite to 1mm long may represent altered biotite porphyroblasts and fine mostly green to blue tourmaline is scattered. This rock is related to the pelitic schists 485095, 485105, but has no andalusite.

485195
18041E, 10056.5N

Chlorite-sericite-leucoxene altered biotite-diorite gneiss.

This rock is related to 485050 and 485109, with sericite ± chlorite after felspar grains to 0.5mm in size, chlorite + leucoxene after minor to abundant schistose biotite, and minor fine metamorphic quartz. Some patches of poikilitic quartz enclose euhedral small sericitised felspar crystals.

The rock shows an irregular contrast between formerly felspathic and formerly biotite-rich domains, with possibly some altered hornblende in the biotite-rich domains.

Leucoxenised oxides are scattered but are less abundant than in 485109.

The original rock was a heterogeneous biotite diorite gneiss.

485243 Quartz-muscovite-biotite-limonite schist, strongly laminated with tight folds.

Metamorphic fine laminations from 0.1 to 1mm thick in this rock, are alternately rich in schistose muscovite and fine granular quartz. Some fine schistose biotite occurs in both lamination types. Some of the thicker laminae are rich in dispersed to densely aggregated limonite, but lack definite evidence of former sulphides. Some of the limonite-rich laminae may represent bedding, and appear to have been tightly folded about the quartz/mica lamination.

485245
17525E, 10094.5N Sericite schist with minor quartz; post tectonic biotite and muscovite.

Schistose sericite dominates this rock, with very minor fine granular quartz, and scattered unoriented post-tectonic flakes of biotite and muscovite, 0.2 to 1mm long. Rare small leucoxenised grains are present.

485261
17205E, 10200.5N

Crenulated sericite-quartz schist with quartz veins. Minor limonite.

Like 485245, this sample has abundant schistose sericite and very minor elongate metamorphic quartz grains to 0.2mm long. The mica is mostly in basalt sections, with some lamellae with their basal cleavage at a high angle to the section. This suggests that the thin section was cut parallel to a crenulated schistosity. Lenses rich in microspherulitic limonite are common.

Lenticular quartz veins to 1mm wide contain very minor limonite, some of which may be after sulphide.

485267
17205E, 10206.5N

Quartz-muscovite schist.

Lenticular laminations in this rock are composed of quartz grains to 0.1mm in size and schistose fine muscovite. Traces of leucoxene are scattered. This rock may have been a siltstone.

485269
17205E, 10210.5N

Muscovite-quartz-biotite-?andalusite-garnet schist.

This strongly schistose metapelite is dominated by fine muscovite, with less abundant quartz and biotite. Scattered mostly clay-altered andalusite poikiloblasts to 2mm long, and partly leached or clay-limonite altered garnet grains to 1mm diameter, occur (as in 485095-105) and there are sparse, small biotite porphyroblasts altered to possible vermiculite.

There is some evidence of post porphyroblast compression.

484991
17205E, 10210.5N

Weathered, sericitised quartz-felspar-biotite schist, possibly derived from a felspathic very fine quartz sandstone.

This fine grained quartzofelspathic schist has a grain size of 0.03 to 0.1mm and could have formed from a very fine sandstone. The felspar has been sericitised and the schistosity is defined by vermiculite-leucoxene altered lenses of biotite, to 3mm long. Narrow quartz veins contain limonite cavities, possibly derived from sulphides.

APPENDIX 2

Method 222 Perchloric acid, hydrochloric acid and hydrofluoric acid digestion, inductively coupled plasma mass sectrometry finish (ICP-MS).(Detection limits in brackets in ppm)

Ag (0.1), Bi (0.1), Cu (2), Mo (0.1), Pb (1), Zn (2), Sb (0.05)

Method 401 Pressed powder X-Ray fluoresce (XRF). (Detection limits in brackets in ppm)

Sn (3), W (5), U (3).