Bureau of Mineral Resources, Geology & Geophysics

R E C O R D

Record 1989/ 54

GEOCHEMICAL SAMPLING IN THE ARUNTA BLOCK, 1980-8

by

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* For brevity the names of 1:250 000 Sheet areas are indicated by bold type and those of 1:100 000 Sheet areas by italics.

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ABSTRACT

Geochemical samples, mainly of granites, but which included some mafic rocks and supracrustals, was carried out in the Arunta Block, central Australia in 1984-5. This record presents the data from the collecting program, together with previously unpublished analyses of samples from the Huckitta Sheet area. Analyses of samples collected from outcrops adjacent to the section of the Deep Seismic line which followed the road from Papunya west to the Ellenburg Range (**Mount Liebig** and **Mount Rennie** Sheet areas) are presented in Appendix 3.

The felsic rocks can be subdivided on their geochemical signature in a *normal suite* of potassic granites and meta-extrusives; an *enriched suite* with low K/Rb, high K, Rb, U, Th, and REE; and a suite characterized by high Sr and low Y, which appears to be localized in the southeastern Arunta Block.

Outcrops along the southern and northern margins of the Ngalia Basin were examined in more detail. Rocks cropping out along the southern margin include orthogneiss (southwest of Shepherds Bore, Rembrandt Rock area), mature and immature sediments (Mount Harris), and supracrustal granulites (northern part of the **Hermannsberg** Sheet area), as well as the previously reported granites. Pressure is estimated at 3-5 kbars in the southern part of the **Napperby** Sheet area, 7 kbars in the northern part of the **Hermannsberg** Sheet area. Outcrops along the northern margin of the Ngalia Basin east and west of Napperby HS are predominantly Napperby Gneiss, an orthogneiss which was deformed in an westerly trending belt (and less deformed north and south of this belt), before intrusion of microgranite.

INTRODUCTION

Material suitable for whole-rock chemistry was collected from the Arunta Block in the 1984 and 1985 field seasons. The chief aim of the project was to supplement existing data, and to extend coverage into areas for which there were no data. The sampling program concentrated on rocks of igneous parentage, particularly on granites. Some mafic units and a few supracrustal rocks were included. The project was thus intended to provide data with which to investigate links between igneous rocks and metallogenesis, to consider comparisons with the other Proterozoic terrains of north Australia, and to provide guidance for future geochronological sampling. This Record contains brief comments on the samples and the areas from which these were collected. The sampling program has provided 132 additional analyses from the Northern Province, 11 from the Central Province and 23 from the Southern Province, presented in Appendix 1. Appendix 2 contains 54 previously unpublished analyses of rocks from the **Huckitta** Sheet area. Analyses of samples collected from outcrops adjacent to the section of the Deep Seismic line which followed the road from Papunya west to the Ellenburg Range (Mount **Liebig** and **Mount Rennie** Sheet areas) are presented in Appendix 3.

The tectonically important region south of the Harry Creek Deformed zone (south of Bald Hill) has not been sampled; nor has the economically interesting **Mount Doreen** Sheet area which has not as yet been mapped. No samples have been analysed from the granites east of the Tarlton Fault, but as these granites are severely weathered (Warren, 1980), drilling would be necessary to obtain fresh material.

Observations on two areas crossed by the BMR central Australian seismic line are included in the Record: **Part IV** deals with the Napperby Gneiss along the northern margin of the Basin; and **Part V** describes the small, scattered outcrops south of the Ngalia Basin (southern **Napperby** and northern **Hermannsberg** Sheet areas).

Two factors hindered locating outcrops suited to geochemical sampling. Firstly, intense weathering throughout the Arunta Block has particularly affected biotite-rich granites/orthogneisses which are susceptible to weathering along foliation to the extent that, even if feldspars are fresh, biotite is iron-stained along the cleavage. Secondly, all the granites (except perhaps some enriched granites) are metamorphosed, most

are deformed, and overprinting in granitic rocks close to shear zones is widespread. As access to outcrops is commonly along valleys which follow shear zones, the more easily sampled outcrops are also more liable to be deformed. The degree of deformation considered acceptable was somewhat arbitrary: though the intent was to reject rocks affected by deformation, in some areas, particularly in the Southern Province, nearly all outcrops have suffered late deformation, and in such areas samples were collected, regardless of deformation.

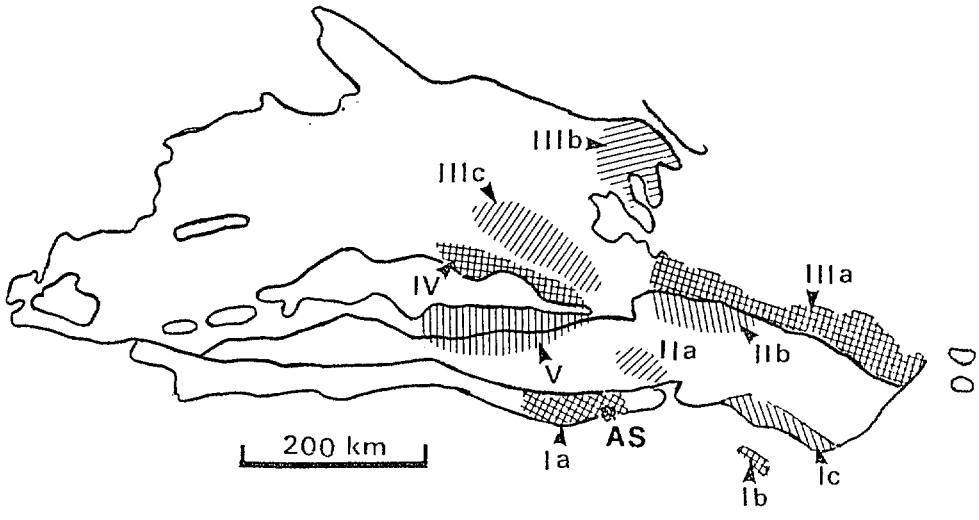

Figure 1. The areas of the Arunta Block covered in the survey:-

I Outcrops in the Southern Province
  (a) in the *Alice Springs* and *MacDonnell Range* Sheet areas,
  (b) the Casey Inlier,
  (c) The **Illogwa Creek** Sheet area

II the Central Province
  (a) Western part of the *Strangways Range Special* Sheet area.
  (b) Northern part of the Central Province

III the Northern Province
  (a) northeastern area, from the Jervois Granite to the Woodgreen Granite
  (b) the southwestern **Barrow Creek** Sheet area
  (c) the Reynolds Range

IV The northern margin of the Ngalia Basin

V The outcrops south of the Ngalia Basin

In the text that follows *normal granites*, the most widely distributed chemically distinctive suite of granites in the Arunta Block, are characterized by high K, K/Rb of 150-250, high Y, and low Sr. *Enriched granite* is used as a descriptive term for granites characterized by many

(or all) of the following:- high K_2O, Rb, Y, Zr, Th, U, REE, and F. Many of the enriched granites also have high Sn, Nb, and Zn. Some have high Li and Cs, though this is not diagnostic, appearing to be a regional characteristic in the southern **Barrow Creek**, **Mount Peake** and northern **Napperby** Sheet areas. Especially, the Barrow Creek Granite, and, less markedly, the granite Egp in this region are enriched granites with high Li, Cs, and also U. The Alice Springs Granite is characterized by low K/Na and Y and high Sr; thus it belongs to a distinctively different suite that includes the Atnarpa Igneous Complex, the Huckitta Granodiorite and possibly the Entia Gneiss. A single sample from the **Mount Liebig** Sheet area that indicates the Alice Springs suite may extent westward is amongst those listed in Appendix 3.

PART I: THE SOUTHERN PROVINCE

(a) The Alice Springs & MacDonnell Ranges *Sheet areas.*

Samples for geochemistry were collected in the Southern Province from near the Stuart Highway, near Old Hamiliton Downs, and in the Alice Valley northwest of Boggy Hole Bore.

Relatively fresh rock is available from the road cuts made during the re-alignment of the Stuart Highway north of Alice Springs, though most of the rocks exposed in these cuts are so intensely deformed and retrogressed as to be unsuitable for geochemistry. A sample (84914045) was collected from porphyroblastic gneiss 3 km north of 10 Mile Bore where material dumped from the road cuts is variable in deformation, but relatively uniform in composition. In outcrop this gneiss is similar to the Burt Bluff Gneiss, the analysis is not very different to that of the Burt Bluff Gneiss collected near the 25 km post on Larapinta Drive. No suitable outcrops of Burt Bluff Gneiss were obtained north of the Chewings Range: all promising outcrops were stained along the well developed cleavage. Light coloured granite bodies within the Burt Bluff Gneiss north of Fish Hole have a chemical signature which indicates these are leucocratic units within the Burt Bluff Gneiss.

Fine-grained biotite gneiss (84094043) collected from outcrops beside the track to Old Hamiliton Downs HS ressembles biotite gneiss near 10 Mile Bore, but is less migmatized. The analysis indicates a meta-tuff.

Quartzofeldspathic gneiss was collected from outcrops south of the Chewings Range in the *MacDonnell Ranges* Sheet area. 84094014 was collected from Eaf, which at the sample site (GR 215739) is a garnet-bearing leucogneiss with muscovite. As the unit is cut off by a narrow shear zone at the sample site, the muscovite may be retrogressive. This granite is finer grained than the Alice Springs Granite, but its chemistry indicates affinity with the Alice Springs Granite. The remaining samples were collected from Ep, a unit of strongly deformed quartzofeldspathic gneiss, usually grey, but in places, pink. Some outcrops contain epidote, either in seams or replacing plagioclase throughout the rock. In thin section mafic minerals include garnet and/or brown-green hornblende, indicating amphibolite facies

metamorphism. Ep is chemically similar to the porphyroblastic gneiss that crops out north of 10 Mile Bore and to the Burt Bluff Gneiss.

The Alice Springs Granite was sampled east of the Old Telegraph Station and from a quarry near the Stuart Highway. The sample from the quarry is a light-coloured even-grained granite, that from east of the Old Telegraph Station is a megacrystic rapakivi granite with pink K feldspar crysts rimmed by white plagioclase. The granite is unusual among Arunta granites in that it is sodic, with $Na_2O > K_2O$, high Sr and low Y and REE. Its chemical affinities are with the Atnarpa Complex to the east and the Huckitta Granodiorite in the eastern Harts Range.

(b) Casey Inlier

The Casey Inlier in the northwest of the **Hale River** Sheet area consists of granite and metasediments unconformably overlain by Amadeus Basin sequence rocks. Exposures in the north are in small hills and boulders in a soil covered plain. About 11km south of Casey Bore there is a marked scarp, caused by active erosion. South of this scarp, the exposures are more extensive. In the extreme south of the Inlier, exposures are covered by sand dunes. The Casey Granite crops out in the north of the Inlier, metasediments (including quartzite and granular conglomerate) in the south and east. The Casey Granite is a gneissic megacrystic type (85094274A, 4276) which is more foliated in the north. A finer grained, slightly more leucocratic phase intrudes the northern outcrops. Some outcrops contain xenoliths of fine-grained biotite rock. Aplites, pegmatites, and rare narrow quartz veins occur within the granite. In thin section the granite contains microcline, quartz, altered plagioclase, biotite, epidote, and metamorphic hornblende enclosing sphene euhedra. Accessory mineral include allanite and traces of late hornblende. Sphene in the groundmass has overgrowths of light coloured sphene surrounding euhedral cores. Nominated type outcrops are 12 km south of Casey Bore, where 85094276 was collected from tors west of the track.

*(c) Southwestern **Illogwa Creek** Sheet area*

The Atneequa Granite Complex (Shaw and others, 1982) intrudes metamorphic rocks in the southwest of the **Illogwa Creek** Sheet area. As the name suggests the unit includes several types. Most of the outcrops

are dark, medium-grained granite with small, scattered K feldspar crysts (85094278, 4281, 4284). A lighter coloured megacrystic variant occurs south and east of Bullhole Dam and leucogranite (85094282B) intrudes the darker phase southwest of Albarta Bore. Diorite, cropping out north of Oolera Spring, was placed in the Atneequa Granite Complex by Shaw and others (1982). A sample, 85094279, collected from the diorite is a fine grained amphibolite (transitional amphibolite grade with both actinolite and blue-green hornblende), the chemistry of which indicates it is unrelated to the Atneequa Granite Complex.

The Aremra Granodiorite is a very deformed tonalite-granodiorite (85094283) near Leaky Bore. It contains abundant blue-green to brown-green hornblende with late biotite and epidote. Outcrops were too weathered for geochemistry.

PART II CENTRAL PROVINCE

(a) Felsic rocks in the western part of the Strangways Range *Special Sheet area*

Three felsic units in the western part of the *Strangways Range* Special Sheet area were collected for geochemistry. Many of the units covered by this Sheet had previously been sampled during the mapping program (Shaw and others, 1979)

The Oolbra Orthogneiss north of the Narbib Deformed Zone is a well foliated biotite gneiss, in places folded and/or strongly deformed. A fresh sample (84914130) was collected 1km south of the road to the Garden HS (GR 900246). At this locality the Orthogneiss is a megacrystic dark gneiss with two generations of K feldspar crysts. The Oolbra Orthogneiss ressembles the Burt Bluff Gneiss to the south and is chemically similar though it is a little enriched in Sr and REE; it also ressembles the Napperby Gneiss to the northwest.

The Wuluma Granitoid south of Saltbush Bore is a medium-grained even-grained pink granite (84914130). Close to its margin it becomes more variable in composition and texture, and includes large bodies of mafic and felsic granulite. The specimen collected in this survey contains 71.28 weight percent SiO_2; the previous analysis of this unit (Shaw and

others, 1979) is much more mafic. Both have very high K/Rb ratios (237 & 268), which nevertheless may be consistent with the origin from a mobilized migmatite complex as suggested by Shaw and others (1979), given that their source is in the Erontonga Granulite, which is characterized by high K/Rb. 84914130 is also very enriched in Ba, and in this respect ressembles the Gumtree Granite; the sample collected by Shaw and others (1979) carries only 820 ppm Ba.

The Gum Tree Granite was collected from the age determination site south of Harry Creek (GR 996282). At this locality the granite (84914131) is a strongly deformed and recrystallized megacrystic orthogneiss with abundant biotite and pink K feldspar. Allanite is present in the sample but the granite is not especially enriched in REE or thorium. North of the blast site the Gum Tree Granite is megacrystic but less deformed, and north of the Garden road the outcrops are fine-grained and aplitic.

(b) The northern part of the Central Province

A sample (73902012) of the granitoid within the Bleechmore Granulite was collected from the blast site previously used for age determination. At this locality the granitoid is a garnetiferous migmatite. Retrogression of garnet to biotite may be related to a fracture zone about 50 m to the north. A second sample (85902013) was collected north of New Bore from the same locality as the age determination sample (73902013), where the granitoid is garnetiferous but not as extensively migmatized.

Garnetiferous migmatitic quartzofeldspathic gneiss (73902009) was collected from the age determination site in the Kanandra Granulite north of Mount Swan Trig. and a second sample (84904060) from a blast site about 1 km southwest of the Trig. Garnet in both these specimens is extensively retrogressed to biotite. The age determination site is about 100 m south of a narrow shear zone, so that retrogression in 73902009 is probably the result of later deformation. A medium-grained, even-grained dark granofels with K-feldspar, biotite, plagioclase, quartz, and hornblende; and a biotite-mafic granulite 984904059A&B) were collected about 1 km north of Mount Swan.

PART III THE NORTHERN PROVINCE

(a) Northeastern Northern Province

The northeastern Arunta Block in the **Huckitta** Sheet area was mapped in 1980 (Shaw and others, 1984), and some geochemical samples were collected (Appendix 2). These showed the area contains a range of granite types, all metamorphosed, including some F-rich granites. Only three granites from the **Alcoota** Sheet area had been analysed previous to this survey.

*(i) Eastern **Huckitta** Sheet area*

Outcrops of Attutra Metagabbro straddle the Lucy Creek road about 7 km north of Jervois Mine. The unit is generally a coarse-grained plagioclase-amphibole rock, some specimens of which contain minor phlogopite, quartz and magnetite. Shaw and others (1984) also reported relatively unmetamorphosed outcrops. Small bodies of fine-grained mafic rock cutting the Bonya Metamorphics west of the Attutra Metagabbro may be offshoots of the main intrusion. The Attutra Metagabbro is intruded by dykes of Jervois Granite and by an amphibolite dyke. A possible correlate of the Metagabbro occurs about 4 km south of Mount Mascotte (859094257).

All granite east of the Jervois Range has been assigned to the Jervois Granite (Smith, 1964; Shaw and others, 1984). Shaw and others (1984) nominated three reference areas. Of these, the area 3.5 km north of Mount Cornish was not included in the survey. Jervois Granite in the outcrops south of the Bellbird Mine is fine-grained, even-grained, and biotite-rich, with numerous dark fine-grained biotite-feldspar xenoliths. Outcrops become lighter-coloured towards the southeast, but without significant change in composition. The xenoliths (85094266A&D) appear to be comagmatic with the granite. Hornblende-bearing meta-tonalite (84094073A) cropping out adjacent to the main road north of Mount Cornish is considered part of this unit. Samples from tors between the main road and the track east from Unca Bore and from the age determination site of Hurley and others (1961) have higher SiO_2 and K/Rb than in the Bellbird phase. Superficially these outcrops ressemble the Jinka Granite rather than the Jervois Granite, but are chemically more akin to the Jervois Granite.

Small intrusions, dykes and sills of fine-medium grained granodiorite (86094343, 88094344) intrude the lineated sequence northeast of Jervois Mine. These are compositionally distinct from the Jervois Granite, with relative flat element distribution patterns, but are nevertheless Sr-depleted. 84094073B, from an isolated boulder close to the Plenty Highway has a similar element distribution pattern.

Fine-grained felsic quartzofeldspathic rocks occur at several localities in the eastern part of the **Huckitta** Sheet area. Since these are interlayered with metasediments they are either volcanic rocks or meta-arkose. Leucocratic quartzofeldspathic rock (85094267A) forms pods and layers in the strongly lineated sequence north of Jervois Mine. The single sample of this unit appears chemically distinct from the Jervois Granite, and possibly from the acid volcanics rocks in the Bonya sequence to the west. Massive quartzofeldspathic rock, interpreted by Shaw and others (1984) as meta-volcanics, extends north from Bonya Bore to near Tashkent prospect. The sample 85094264 collected east of Bonya Bore is considerably enriched in Cu, Pb and Zn relative to felsic rocks in this district, possibly indicating affinities with the Jervois lodes. The strongly lineated glassy rocks cropping out immediately to the west of White Violet Prospect are also regarded as metavolcanics. These and the fine-grained pink quartzofeldspathic gneiss in the Mascotte Gneiss west of White Violet prospect appear chemically related to the metavolcanic rocks in the Bonya Bore area. The metavolcanic rocks in the Bonya Hills carry slightly high W values. Though these values are higher than those found in the meta mafic volcanic rocks immediately adjacent to the scheelite prospects, they are not so high as to demonstrate a source for the mineralization.

A small outcrop of megacrystic granite with hornblende-bearing migmatitic segregations 6 km west of Eurolley Bore has been correlated with the Jinka Granite (Smith, 1964; Dobos, 1978). However its chemical affinities lie with the meta-acid volcanics extending north from Bonya Bore, and therefore it is better regarded as one of the older granites in the area.

The Kings Legend Amphibolite is a layered mafic unit within the Bonya sequence. Geochemical samples have been collected from the poikiloblastic layer from near Ramseys prospect (85094261), near

Marrakesh (80093533) and immediately west of Samakand (85094262A). The fine-grained upper unit was collected just east of Samakand (85094262B).

(ii) Central ***Huckitta*** *Sheet area*

The main outcrops of *Jinka Granite* are in the Jinka Plain north and south of the Elyuah Range, with a nomimated type area about 5 km northeast of Grant Bluff. Samples collected from this area (Shaw and others, 1984; 80093519, 20 & 21, see Appendix 2) are enriched in F and have low K/Rb. A darker phase collected from a blast site east of Gap Bore and immediately under the Late Proterozoic unconformity shows the same enrichment in K, Rb and Th. The Jinka Granite is the easternmost of the enriched granites that extend across the Northern Province. The granite in drill core from the fluorite prospects is intensely altered, with pink K feldspar, muscovite and chlorite. The source of the fluorite is most probably the Jinka Granite, with its high fluorine content.

(iii) Western ***Huckitta*** *Sheet area*

Additional samples have now been collected from the Dneiper Granite. The sheet-like gneissic granite mapped as Pgg appears to be part of the Dneiper Granite, which becomes progressive more leucocratic as it is traced westwards.

Additional samples were collected from the unnamed granites in the east of the *Dneiper* Sheet where Egr was mapped out as a weathered granite with red photo-tone and reddish poorly exposed outcrop; while Egy, Egc and Egk all are reasonably fresh units. Egk is distinct in outcrop, being crowded with numerous small laths of K feldspar, and chemically, being enriched in K, Rb, REE, U and Th. The simplest relationship on field evidence between Egr, Egy and Egc is that Egr is more weathered Egy, and Egc is the leucocratic equivalent of Egy. The chemical data support this, and all are now considered to be part of a single suite, for which the name Alinajera Suite is recommended. Ega, south of the Delny-Mount Sainthill Fault is considered equivalent to Egc.

One sample of the amphibolite within the Cackleberry Metamorphics was analysed. Though the unit physically ressembles the Kings Legend Amphibolite, in its sheet-like form and its porphyroblastic texture, its chemical affinities are with the Attutra Metagabbro.

CRA exploration investigated a small tin occurrence southeast of No 2 Bore on Mount Swan Station. The granite in the vicinity of the prospect, exposed in low but fresh boulders in a plain of Tertiary sediments, is a medium-grained, poorly foliated granite. The predominant dark-grey biotite-rich phase (84094061A) is cut by minor dyke-like lighter coloured bodies (84094061B). These samples do not have the usual characteristics of tin granites, and the Mount Swan Granite to the north is not enriched in Sn. The source of the tin therefore remains enigmatic. A sample (84094056) collected from the charnockite in the Perenti Metamorphics near Tower Rock, some 15km to the north, appears most closely related to the granite near the tin prospect, but is at much higher metamorphic grade.

The blast site in the Mount Swan Granite from where the sample,F53/11/3, dated by Hurley and others (1961) had been obtained was relocated: material from this locality is very similar to the previous sample 80096559 collected nearby, but more enriched in Rb and Th. The southern Mount Swan Granite has not been sampled, but the radiometric map (Wyatt, 1974) indicates the southern outcrops have the same high Th and U content as the northern outcrops. The Mount Swan Granite is therefore included with the enriched granites. The outcrops of megacrystic granite south of the Delny-Mount Sainthill Fault previously assigned to the Mount Swan Granite (Shaw and others, 1975) lack the characteristic signature of enriched granites and are more closely allied to the Jervois Granite.

*(iv) Central-northern **Alcoota** Sheet area*

The Copia and Mount Ida Granites were collected west of the Bundey River. The Copia Granite is a markedly foliated granite with a strongly lineated fabric. It is considered the oldest granite in the area, and is correlated with the Dneiper Granite to the east and the Crooked Hole Gneiss (not sampled) to the west.

Mount Ida Granite was collected from blast sites west of Western Watering Point. The Mount Ida Granite shows chemical characteristics (high K, Rb, Th and U and low K/Rb) which indicate it is closely related to the Mount Swan Granite and likewise is classified as an enriched granite. However it is unusual in that it lacks the characteristic K feldspar laths of enriched granites. The garnet-muscovite granite

72902006 which occurs in the same area was collected: it was mapped as part of the Mount Ida Granite, but is chemically distinct, with very low Ca and Sr, and is therefore more probably related to the pegmatites which form large intrusive bodies in the district.

The Woodgreen Granite was regarded during regional mapping as a composite body. Two phases were collected from southwest of West Bore: the dark megacrystic phase (84904047) considered the characteristic Woodgreen and a fine-grained light-coloured phase (84904048) which ressembles a microgranite, but is not enriched. A third phase intermediate between the two occurs in the same area but outcrops were not suitable for chemical analysis. The Woodgreen Granite includes large bodies of fine-grained leucocratic quartzofeldspathic gneiss with large garnet porphyroblasts west of West Bore: these may be equivalent to the garnet-bearing phase previously reported (Shaw and others, 1975). Although the radiometric map (Wyatt, 1974) indicates high Th and U in the area where the Woodgreen Granite crops out, the megacrystic phase shows no especial enrichment in U, but has slightly high Th and REE; the leucocratic phase is high in U. Both have high K/Rb, more typical of the less enriched suite.

*(b) Granites in the **Barrow Creek** Sheet area*

Granite constitutes the major part of the outcrops assigned to the Arunta Block in the **Barrow Creek** Sheet area (Smith & Milligan, 1964).

(i) The Crawford-Osborne Range area

Fresh granite and porphyry crops out in small hills and at plain level between the Crawford and Osborne Ranges in the northwest of the Sheet area. Dark porphyry (85094235) with K feldspar crysts to 3 mm in a tough glassy matrix, 3 km southeast of Claypan Bore, appears to be unmetamorphosed in the field. However, in thin section, it is completely recrystallized, with clots of biotite, biotite-epidote, biotite-sphene, epidote, and rare biotite-muscovite in a equant polygonal matrix of quartz, feldspars, biotite, epidote, and apatite.

A tonalite to granite complex crops out northwest of Claypan Bore. The most melanocratic phase (85094232A) is a plagioclase-biotite rock with

little quartz and no K feldspar. This phase is intruded by a leucocratic phase containing microcline crysts 2 km south of the bore at the northwest of the Osborne Range and by a co-magmatic leucogranite to the southeast of the Bore. Elsewhere there is continuous gradation from tonalite to leucotonalite. No contacts between the tonalite complex and the metasediments of the Osborne Range were found. Strongly lineated dark orthogneiss with K megacrysts cropping out as low boulders amongst mulga 11 km southeast of Claypan Bore is considered to be the deformed megacrystic phase of the tonalite complex. Isolated outcrops of leucocratic tourmaline-bearing granite about 7 km southeast of Claypan Bore have a chemical signature that generally suggests these are at the high silica end of the same suite as the Osbourne Range complex. The single sample is enriched in U & Th relative to the "normal" Osbourne Range samples, but lacks the characteristics of the Barrow Creek Granite.

(ii) The Barrow Creek district

The **Barrow Creek** geological map shows an extensive area of Barrow Creek Granite in the district surrounding Barrow Creek township. In outcrop this district appears to contain two granite units. A gneissic biotite-rich megacrystic unit crops out at the Barrow Creek Racecourse and in the pediment of the mesas capped by Central Mount Stuart Beds southeast of the racecourse. Similar strongly foliated granite crops out about 7 km southeast of Ooralingie Bore. The second unit is less gneissic, physically ressembles the late enriched granites, and similarly has high U, Th, RE and low K/Rb. It appears to intrude the gneissic granite southeast of the racecourse. However both types, and indeed all samples from the Barrow Creek district and the microgranite at the southeastern corner of Stirling Stn, have high Li, higher than normal for Arunta granites by a factor of 5X to 10X, and also unusually high caesium. The area of outcrop of the Barrow Creek Granite gives a distinct high on the radiometric maps of the region. However the Barrow Creek Granite is not characterized by the high REE content that marks most enriched granites. Moreover the suite of samples from the Barrow Creek Granite is unique amongst the Arunta collection in that it shows a distinct trend of decreasing K/Rb with increasing silica content, suggesting a fractionated suite.

High Li values, though not as elevated as those in the Barrow Creek Granite, have been reported in samples collected in the Mount Peake Sheet area to the west (Stewart and others, 1980), where Pontifex (1966) identified lithium minerals in pegmatites. Granite in the Anmatjira Range is higher in Li than granite collected south of the Range which it otherwise ressembles. Thus a province of Li-enriched granites extends from southeast of Ooralingie Bore through Barrow Creek and Aningie at least to Mount Leichhardt and includes the northern part of the Napperby Sheet Area. Pegmatites in this area may be prospective for lithium minerals.

(iii) The Ivy Mine area

Deeply weathered granite exposed in low rises northwest of the Ivy Mine is a coarse-grained leucocratic two-mica granite cut by numerous pegmatites. Tourmaline is locally abundant.

Small tin mines (Ivy and related workings) about 12 km north of Barrow Creek are in weathered metasediments, predominantly two-mica quartz schists but including minor fine-grained, even-grained muscovite-biotite-feldspar-quartz rock, which may be a volcanoclastic sediment, or more likely a fine-grained felsic tuff. The layered units are intruded by quartz veins parallel to the layering. Abundant tourmaline is developed along the walls of the veins and small outcrops of black, fine-grained tourmaline rock occur in the vicinity of the workings.

(iv) Area south of Ooralingie Bore

Weathered granite crops out out as basement beneath the Central Mount Stuart Beds northeast of Mount Octy. Near Adnera Waterhole a coarse-grained even-grained garnetiferous two-mica granite intrudes fine-grained quartzofeldspathic gneiss. This granite physically ressembles the pegmatite-related granite near Western Watering point on the Alcoota Sheet area. Outcrops are too weathered to sample.

Medium-grained two-mica granite near the southeast corner of Stirling Stn, which contains high U and Th, is considered to be part of the Li-enriched Barrow Creek Granite.

(v) The microgranite at the 278 km quarry site

A small plug of micro-granite at 278 km on the proposed Alice Springs to Darwin railway was drilled to appraise the material for ballast. The drill core is heavily fractured and the granite is weathered, with pink feldspar and greenish biotite. The freshest available material was selected from the base of DD 5 at 33.6-34.6 m. Analysis of this (85094287) shows that the microgranite is chemically similar to the granite suite and acid volcanic rocks in the Osborne Range.

(c) The Reynolds Range area

A number of granite samples were selected for chemical analysis during the regional mapping program in the Reynolds Range area (Stewart and others, 1980). The initial delineation of units of granite *s.l.* involved structural and metamorphic criteria. On chemical criteria the granites present a much more simple picture: essentially the granites can be resolved into two types: the normal Arunta suite, and enriched granites, which are extensively developed north of the Anmatjira Range. The intention was to supplement the existing collection in order to provide a more even coverage of the area, but the field campaign proved difficult, mainly because of the absence of suitably fresh outcrops. Weathering was more severe and extensive than is indicated in reports on the area. Differences in flora appear not to correlate with chemical suites, but possibly correlate with SiO_2 content. Spinifex colonizes some siliceous granites, where it is commonly associated with *Acacia monticola*.

The **Anmatjira Orthogneiss** as presently mapped extends the length of the Anmatjira Range. Metamorphic grade increases to the southeast, so that muscovite occurs in the northwest (e.g. near Black Hill) and garnet in the southeast (e.g., near Blue Bush Dam.); and there is an area of low pressure high temperature metamorphism, interpreted as a regional hornfelse by Stewart and others (1980), in the Mount Stafford district. The Anmatjira Orthogneiss has been described as in part, an augen gneiss and in part, a rapakivi granite. In outcrop it is a megacrystic granite with white rounded K feldspars and locally a strong foliation, as at the type locality near Ingallan Spring. In the southeast the Anmatjira Orthogneiss intrudes the Possum Creek Charnockite, and is intruded by the leucocratic Aloolya Orthogneiss, which on chemical criteria is

consanguineous with the Anmatjira Orthogneiss. Northeast of The Reward Mine the type Anmatjira Orthogneiss is intruded by granite with high U, Th , K, and Rb. On the northern edge of the Range, younger, fine-grained enriched granite (85924227) occurs in sheets folded with the main Anmatjira Granite. Closer to the Reward, the younger unit crops out as tors of megacrystic granite, which are very weathered.

Three units of granite have been mapped out in the valley been the Anmatjira and Reynolds Ranges. The **Harverson Granite**, has been mapped as cropping out in tors in rolling hills between the Anmatjira and Reynolds Ranges northwest of Pine Hill homestead. The Harverson Granite was considered the youngest granite in the area, because it is apparently not cut by metamorphosed mafic dykes, which intrude the other granites. However the mafic dykes terminate against a poorly exposed shear zone, and the Harverson Granite is not markedly different from the **Airy Orthogneiss** and **Yaningidjara Orthogneiss** though some outcrops of Airy Orthogneiss are more deformed, and the Yaningidjara Orthogneiss is at higher metamorphic grade, and so contains garnet. All three exhibit rapakivi texture, contain rafts of fine-grained quartzofeldspathic gneiss, and are covered by the same broad radiometric low. In the type area the Harverson Granite is a very coarse-grained megacrystic granite with rounded K feldspars set in a matrix of greenish plagioclase, pale blue quartz, biotite and muscovite. Rimmed feldspar (rapakivi texture) is present in outcrops at the type locality. Biotite, which forms rounded aggregates to 1 cm, may in part pseudomorph garnet. The granite intrudes Lander Rock Beds 2 km southeast of Algamba Bore without either a chilled margin or obvious hornfelsing. The outcrops mapped as Harverson Granite are less chemically diverse than the Yaningidjara Orthogneiss, which includes very siliceous outcrops, thus resembling the southeastern exposures of Anmatjira Orthogneiss and Aloolya Orthogneiss.

Outcrops of granite intrude the Reynolds Range Group in the upper Woodford River valley (85924189) and southwest of White Hill. These outcrops are extensively migmatized with garnet and garnet-quartz symplectites enclosed within the melt. Chemically this granite correlates with the main phase of Napperby Gneiss to the south and the Boothby Orthogneiss to the east. However a sharp radiometric high over the easternmost of these outcrops indicates that there may also be microgranite.

The **Boothby Orthogneiss** is a gneissic megacrystic granite cropping out east and west of the Stuart Highway north of Aileron. Locally it contains garnet and migmatites with garnet-quartz symplectites. At Mount Boothby and west of Prowse Gap it forms sheets, folded in with the metasediments it intrudes. The Boothby Orthogneiss (e.g., specimens, 84924097, 099 and 102) has a chemical signature similar to the Napperby Gneiss; the Boothby Orthogneiss is probably best regarded as the eastern, higher metamorphic grade extension of the Napperby Gneiss. A small body of charnockite (84924105) and garnetiferous orthogneiss which intrudes mafic granulite south of Aileron has been mapped out as a separate unit, chemically it is part of the Boothby Orthogneiss. Granite mapped as Boothby Orthogneiss northwest of Aileron contains euhedral K feldspars, suggesting affinities with the enriched granites, which are also apparent in the analysis of 84924103 from the age determination site in this area. North of Prowse Gap the Boothby Orthogneiss intrudes fine-grained grey gneiss (84924098) which may be igneous (meta-tuff) but belongs to a different suite from the Boothby Orthogneiss. Migmatized grey gneiss (84924100, Aileron Metamorphics) at the age determination site north of Aileron is unusual: this is very low in K_2O and Rb, and high in Na_2O and CaO (for the SiO_2 content) and may be a reworked tuff or immature sediment.

The **Napperby Gneiss** is described below, in Part IV. No sample was collected from the type locality at 20 Mile Waterhole (a geological monument).

PART IV THE NGALURBINDI HILLS - YALYIRIMBI HILLS REGION.
(Northern margin of the Ngalia Basin)

The Ngalurbindi and Yalyirimbi Hills straddle the Central Australian Seismic line west and east of Gidyea Bore. Outcrops have been assigned to the Ngalurbindi Orthogneiss (Ngalurbindi Hills) and Napperby Gneiss (Yalyirimbi Hills) (Stewart and others, 1980). In the east, the Napperby Gneiss intrudes metasediments, mainly calcareous rocks, of the Wickstead Creek Beds. Major and minor shear zones with west to west-northwest trends cut across all units. Movement across these was in places considerable, juxaposing different units; and retrograde metamorphism involving hydration is locally intense adjacent to the shear zones.

Stewart and others (1980) described considerable heterogeneity within both the Ngalurgbindi Orthogneiss and Napperby Gneiss. Some of the variation can be ascribed to variation in metamorphic grade, some to regional or local deformation, and some to retrogression. The area mapped as Napperby Gneiss includes at least three distinct units, and the major unit grades from more mafic at the western end to leucocratic at the eastern end. Outcrops northwest of Limestone Bore and near Mica Dam mapped as Ngalurbindi Orthogneiss are superficially similar to nearby outcrops of Napperby Gneiss, though they are darker. The specimen analysed from the Ngalurbindi Orthogneiss has a chemical signature generally similar to the Napperby Gneiss, though somewhat higher in Li (60 ppm as opposed to 10-30 ppm in the Napperby Gneiss).

The principal units within the outcrops mapped as Napperby Gneiss are:-

1. *20 Mile Waterhole type* (type locality) is a layered migmatitic gneiss. Two episodes of migmatitic segregation have occurred; early migmatites are parallel to the foliation, a second generation cuts across the foliation. The gneissic fabric has been folded into flat-lying tight to isoclinal folds and then by one or more open upright fold episodes. Outcrops assigned to this unit were sampled immediately south of Anna Reservoir (85924196), on the Aileron-Napperby boundary fence (85924200), in the headwaters of Wallaby Creek (84924188), east of Napperby HS (85924162C & 4163A) and north of 20 Mile Waterhole (85924183B). The gneissic granite cropping out along the seismic line is considered part of this unit, as is the intensely migmatized unit at the age determination site (72921019). This unit, delineated from the remaining units only by virtue of its strong deformation, crops out between the Napperby Structure and a quartz-filled fracture about 10 km to the north. Strongly lineated granite west of Napperby HS and near Sugarbag Bore may be part of this unit.

2. *Dark, megacrystic granite* is a coarse-grained, poorly foliated granite with rounded K feldspar crysts to 4 cms. Samples of this unit were collected southeast of 20 Mile Waterhole (85924155), southeast of Anna Reservoir, 85924198A&B) and northwest of Napperby homestead (85924167). This granite appears more biotite-rich than the 20 Mile Waterhole exposures, but chemical analyses indicate essentially no difference. Similar granite crops out close to the track northwest from Gidyea Bore and north of the fault north of North 20 Mile Waterhole.

3. *Light coloured granite* intrudes the strongly deformed granite in the area from Gidyea Bore northwards and eastwards beyond Georges Yard. This unit was sampled in Napperby No 9 (86924353), drilled near Gidyea Bore.

4. *Dark grey strongly foliated biotite-quartzofeldspathic gneiss* or orthogneiss (84924089) occurs northwest of Napperby HS. Locally the unit contains small rounded K feldspar crysts. It is cut by migmatites (more than one generation) and by pegmatites. Contacts in Napperby Creek suggest this is the oldest unit, and is intruded by the gneissic unit. However, as the two are chemically very similar, this unit may be a metavolcanic co-magmatic with the Napperby Gneiss.

5. *Granite containing small laths of K feldspar* occurs as small bodies within the Napperby Gneiss. Southeast of 20 Mile Waterhole this unit intrudes the megacrystic unit. The very weathered outcrops near the seismic line 6 km south of Napperby HS belong to this unit, as do outcrops adjacent to the fault south of Limestone Bore. This unit (84924085, 85924156A) has the signature of the enriched granites. Both physically and chemically it ressembles the granite Pgk in the Huckitta Sheet area.

6. *Microgranite* forms small bodies within the Napperby Gneiss. Outcrops vary from dark (e.g., immediately east of Napperby HS - 85924163B) to light-coloured. The unit is always even-grained, and by comparison with the enclosing Gneiss, fine-grained. Characteristically this unit contains monazite, and so is responsible for the peaks on the radiometric map over the Yalyirimbi Range. The fine-grained felsic rock sampled for age determination north of Rabbit Well is part of this unit.

7. *Leucogranite* forms small outcrops of unfoliated sugary granite in the area east of 20 Mile Waterhole. This may be mobilizate related to pegmatites.

Metamorphic grade is generally amphibolite, probably reaching granulite in the area near Rabbit Well. Metamorphic grade also increases in the area north of North 20 Mile Waterhole, where garnet is present in the migmatitic segregations.

PART V GEOLOGICAL RECONNAISSANCE OF THE AREA SOUTH OF THE NGALIA BASIN BETWEEN THE STUART HIGHWAY AND MOUNT WEDGE.

Outcrops south of the Ngalia Basin occur in small hills rising above a plain of sheet sand, localized dunes, flood-outs and calcrete (Fig. 2). On the existing 1:250 000 geological maps these scattered outcrops are shown as mainly or completely granite. Glikson (1983) remapped the outcrops in the northern part of the Hermannsberg Sheet area, and reported that these were predominantly high grade metamorphic rocks. This survey is in agreement with Glikson's (1983) appraisal, but there is a greater diversity of rock types, particularly an abundance of metasediments, than was previously reported. The outcrops in the southern part of the Napperby Sheet area contain some granite, but also metasediments.

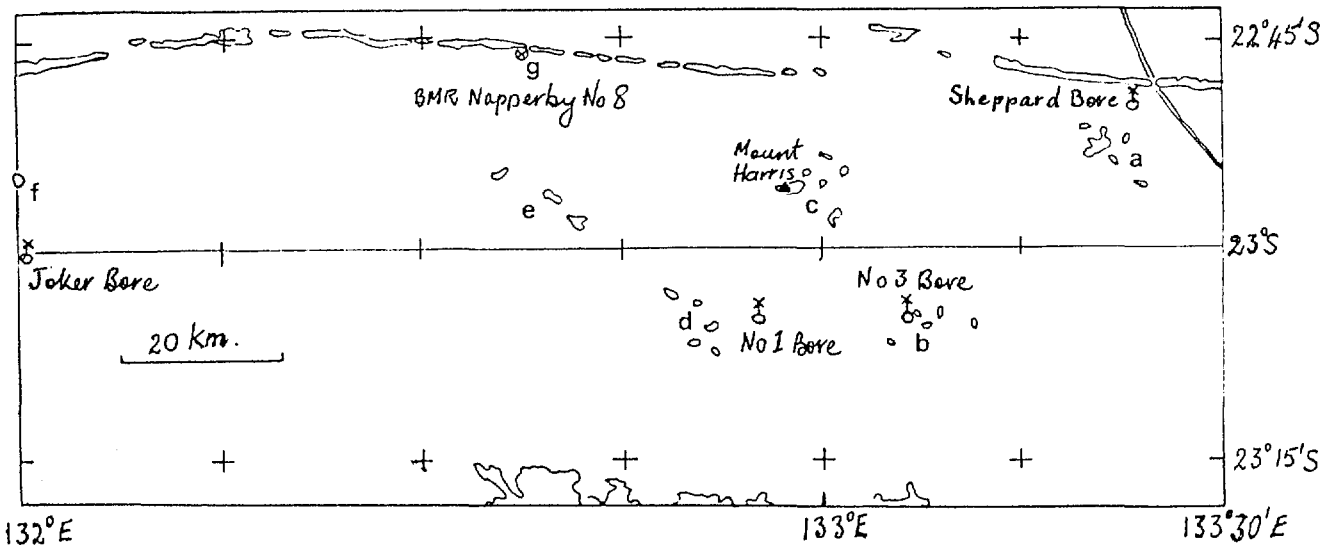

Figure 2. Distribution of outcrops in the region south of the Ngalia Basin. (a) southwest of Sheppard Bore, (b) near No 3 Bore Anburla (c) at Mount Harris (d) near No 1 Bore, Anburla, (e) the Rembrandt Rock-Wirmbrandt Rock district, and (f) north of Joker Bore. Granite in core from a hole drilled at the base of the Hann Range adjacent to Napperby Creek (g) was also analysed.

(a) Outcrops southwest of Sheppard Bore

The outcrops southwest of Sheppard Bore are predominantly migmatitic quartzofeldspathic gneiss which have been intruded by a small granite body. Several large veins of jaspery, limonite-stained, quartz form isolated ridges in the north, east and southeast of the area (Fig. 3).

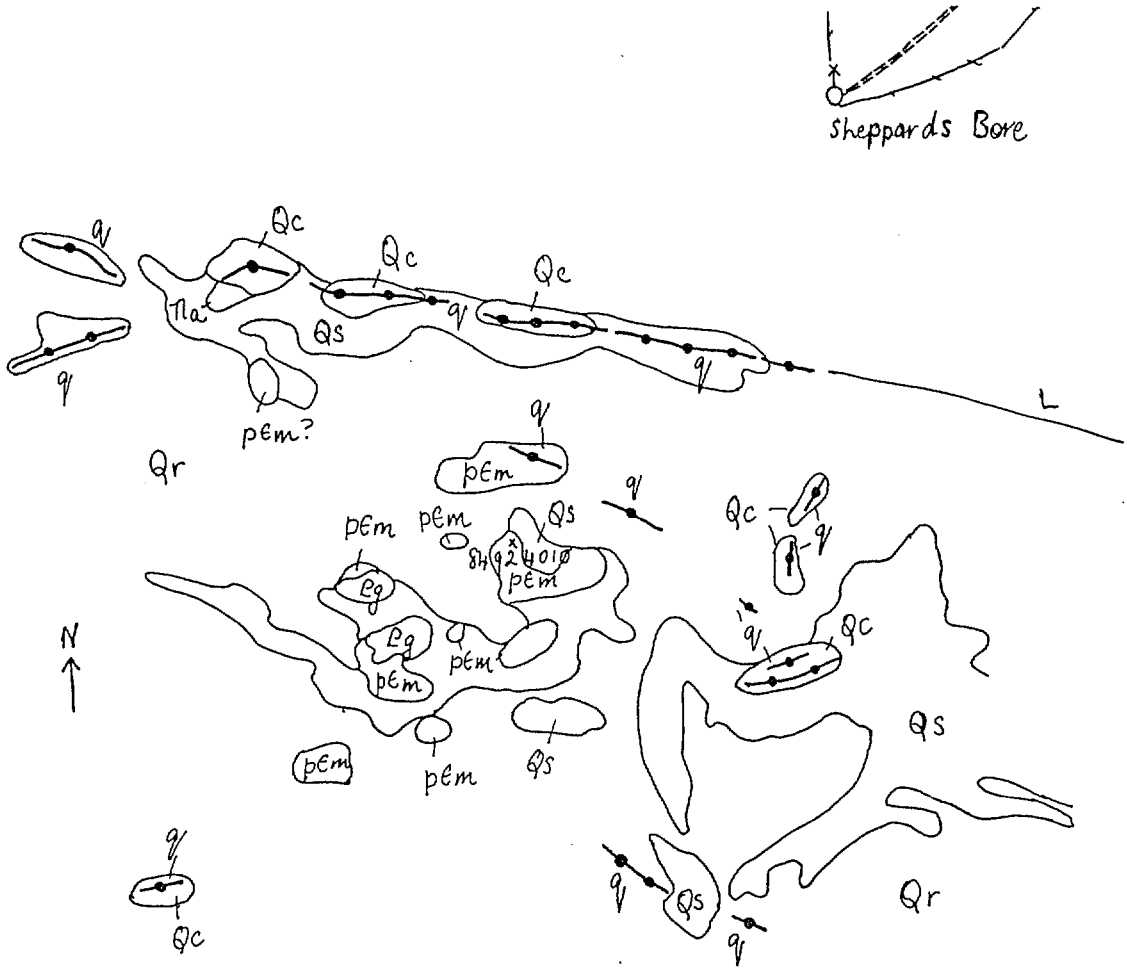

Figure 3. Distribution of rock units in the area southwest of Sheppards Bore. Scale approx. 1:80 000.

Tertiary and Quaternary units common to Figures 3 to 8. Qh Recent lake sediments. Ql Calcrete. Qc Coarse slope deposits. Qr Red soils (with mulga groves). Qs Sand sheet and dunes. Tla Laterite.

The quartzofeldspathic gneiss is a grey gneiss consisting of biotite, hornblende, two feldspars and quartz. It varies from finely-layered fine-grained to medium-grained, more coarsely-layered gneiss with scattered rounded megacrysts of potassium feldspar. Some late migmatites with quartz and feldspar, best developed in the coarser-grained outcrops, cross-cut and kink the foliation.

These quartzofeldspathic gneisses have been affected by one or more deformations after formation of their foliation (which may itself be tectonic). The main foliation is, in various outcrops, folded about small folds with steep plunges, crenulated, and disrupted by late migmatites.

Hornblende, indentified optically as hastingsite, indicates that the metamorphic stage in which the cross-cutting migmatites formed was upper amphibolite. The formation of interfolia migmatites indicates the earlier stage in which this foliation formed was also high grade.

The quartzofeldspathic gneiss is more compositional uniform over its outcrop area than a volcanogenic unit would be, and moreover lacks the interlayered basic units which characterise the Strangways Metamorphic Complex to the southeast. The quartzofeldspathic gneiss is therefore interpreted as a deformed orthogneiss, similar to the Oolbra Gneiss and the Burt Bluff Gneiss. Similar rocks crop out southeast of Mount Harris and as a raft in granite northwest of Rembrandt Rock.

The small body of granite which occurs in the west of the scattered outcrops is a medium-grained slightly gneissic granite with small rimmed potassium feldspar crysts. In thin section it contains both orthoclase and microcline, hornblende (hastingsite), partly replaced by biotite which in part defines a metamorphic foliation. Allanite is a minor accessory mineral. Numerous dark femic xenoliths appear in hand specimen to be formed of fine-grained biotite. The granite incorporates thin siliceous layers with fine internal layering, possibly cherts or calc-silicate bodies. On airphotos the granite can be distinguished by the larger bare surfaces developed over it as compared to those on the quartzofeldspathic gneiss.

(b) Area near No 3 Bore, Anburla

The outcrops in the vicinity of No 3 Bore on Anburla (Fig. 4) are all granulite or retrogressed granulite: they include felsic and mafic rocks and metasediments. The small hill 8 km east of the bore was not visited. The remaining outcrops can be considered as two groupings: the two hills about 3.5 km east-northeast of the bore, and the two hills east and west of the bore together with the hill about 4 km southwest of the bore.

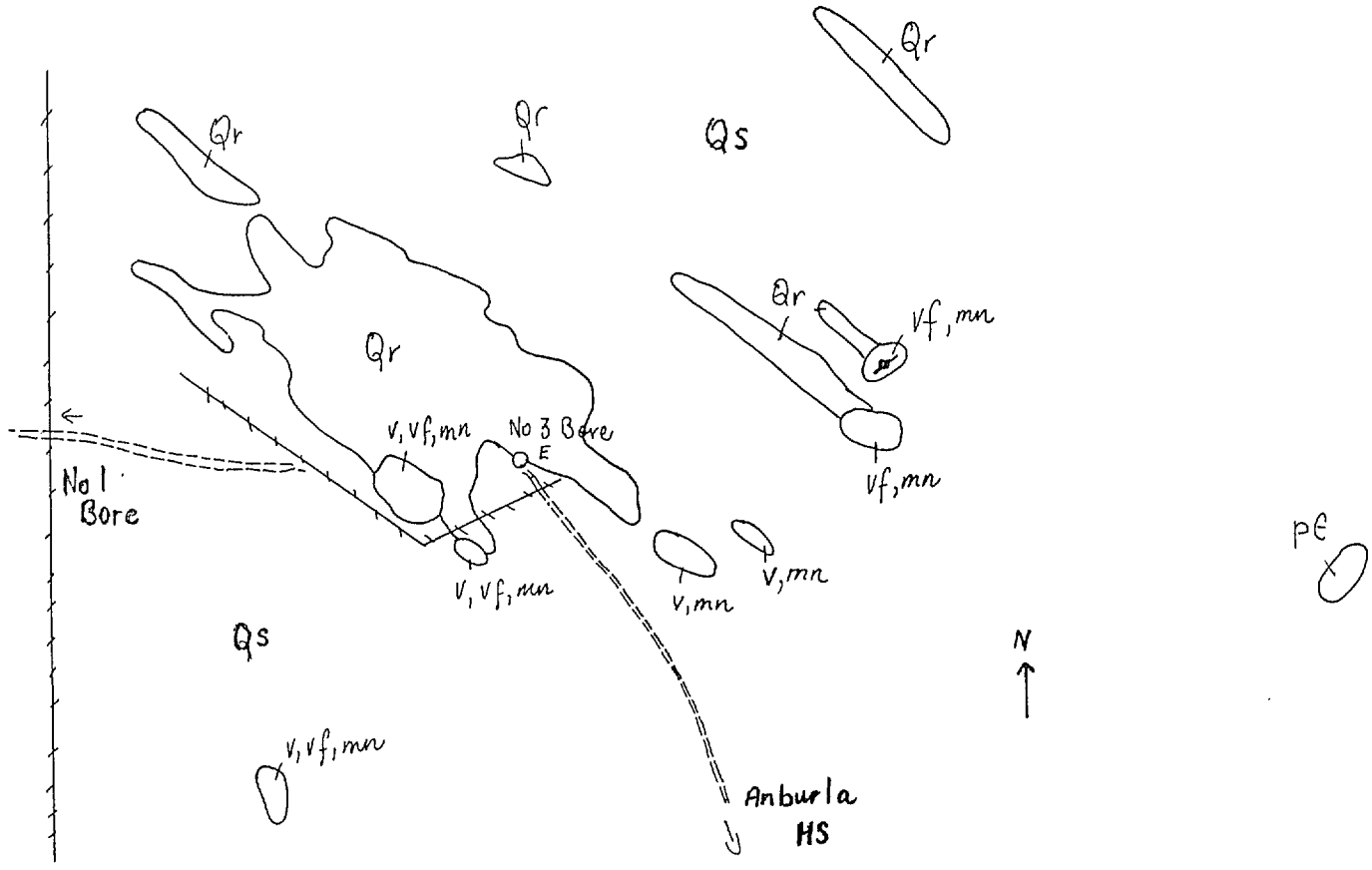

Figure 4 Distribution of rock units near No3 Bore, Anburla. Scale approx. 1:80 000. v garnetiferous gneiss, vf garnet-bearing quartzofeldspathic gneiss, mn mafic granulite.

The two hills northeast of the bore consist mainly of coarse-grained quartzofeldspathic rocks, commonly with garnet. Some also contain orthopyroxene. Large feldspar megacrysts occur in some outcrops. Mafic granulite forms irregular boudinaged pods within the quartzofeldspathic gneiss, and there are minor outcrops of metasediments, including calc-silicate rock.

The two hills to the east and west of the Bore and the hill to the southwest contain a suite of garnet-bearing rocks. The predominant rock-type is migmatitic gneiss containing biotite, garnet, plagioclase, K feldspar and quartz. Compositional variants include biotite-sillimanite-bearing rocks, feldspar-garnet-quartz and garnet-quartz rocks. Cordierite-bearing rocks are a minor component of the outcrops; and

there are rare calc-silicate rocks. Mafic granulite occurs as boudinaged pods within the garnetiferous gneisses, becoming locally abundant in the hill just to the southwest of the bore.

The metamorphic grade is granulite, of high T, low P type. The leucosomes in the migmatites contain euhedra of garnet within the quartz-feldspar segregations.

These outcrops are very similar to units such as the Kanandra Granulite within the Strangways Metamorphic Complex (Division 1). They are considered to be metamorphosed volcanic rocks, with interlayered immature sediments and calc-silicate lenses.

(c) Outcrops in the Mount Harris district

The western end of the ridge that contains Mount Harris (Fig 5) is grey fine-grained quartzofeldspathic gneiss or biotite-quartzofeldspathic gneiss, generally with a strongly developed near-vertical lineation. Coarse-grained opalescent blue quartzite forms a prominent ridge to the south of the main ridge and occurs as small lenses or discontinuous layers within the main ridge. At the eastern end of the main ridge the principal rock type is sillimanite-bearing granofels, and pods and layers of quartzite form prominent ridge caps. The quartzite bodies may be conformable, but this is uncertain as contacts between quartzite and other metasediments are obscured by scree.

Exposures are poor, but the outcrop pattern suggests a large scale fold at the eastern end of the main ridge. The steep lineation at the western end of the main ridge is parallel to the axes of small scale folds with axial plane striking 40^{o}. The quartzite lacks the well developed lineation of the gneisses.

The main ridge is intruded by a coarse-grained megacrystic granite which forms tors along the south side of the ridge. An excellent cross-cutting relationship with the quartzite is exposed at the eastern end of the main ridge. Fresh granite is grey, with white feldspars, including rounded microcline crysts to 5 cm, abundant black biotite and pale blue quartz.

The small hill to the northeast of Mount Harris contains a fine-grained, even-grained granite. Small pods of metasediments and the megacrystic granite from Mount Harris occurs as rafts and xenoliths in this granite. The granite consists of perthitic microcline, plagioclase, biotite, muscovite and monazite. The monazite, and associated high Th and U account for the sharp peak over this body on the radiometric map.

Figure 5. Distribution of outcrops in the Mount Harris district. Scale approx. 1:80 000.

The low hills about 7 km southeast of Mount Harris contain strongly foliated quartzofeldspathic gneiss with rounded K feldspar megacrysts.

Foliation strikes 0-10°, with near-vertical dip. A small body of well foliated gneiss which crops out about 2km east-northeast of Mount Harris may be part of this unit, but is more probably a poorly exposed shear zone in the megacrystic granite.

The metamorphic grade is amphibolite. Sillimanite, possibly with cordierite, occurs in the main ridge. Clots of biotite in the same rocks may have replaced cordierite or garnet. Muscovite is present in some of the granite, and epidote is locally developed. The presence of perthite but absence of orthoclase suggest conditions were lower amphibolite.

The quartzofeldspathic gneiss and sillimanite gneiss may be metatuffs. The coarse grainsize of the quartzite indicates it is more likely to be a metamorphosed clean sandstone than a meta-chert. The units at Mount Harris, taken together, ressemble the grey gneiss, megacrystic Burt Bluff Gneiss and Chewings Quartzite in the vicinity of Old Hamilton Downs HS at the western edge of the *Alice Springs Special* geological map (Offe, 1983), but are lower in metamorphic grade. Stewart (1982) has suggested the quartzite should be correlated with the Mount Thomas Quartzite in the Reynolds Range. The other metasedimentary units are less mature than either the Lander Rock Beds or Pine Hill Formation in that area.

Analyses suggest there is little difference between the megacrystic granite and the quartzofeldspathic gneiss, and these in turn are similar both to the quartzofeldspathic gneiss southwest of Shepherds Bore and to the Napperby Gneiss (See below.) The megacrystic gneiss is very similar physically to the megacrystic phase of the granite in the Rembrandt Rock district. The fine-grained granite northeast of Mount Harris has chemical characteristics that indicate affinities with the microgranites in the hills east of Napperby HS, north of the Ngalia Basin.

(d) Outcrops near No 1 Bore, Anburla

A number of small hills containing granulites, predominantly of metasedimentary origin, occur some 6-10 km west of No1 Bore on Anburla (Fig. 6). Coarse-grained garnet-quartzofeldspathic gneiss and coarse-grained granitoid occur in the small hill about 1 km south of the track leading westwards from the bore. The next hill southwesterly contains

strongly lineated charnockite and mafic granulite with thin layers of quartzose gneiss. Mafic granulite and light-coloured biotite-bearing mafic granulite occur in the next hill southeastwards, but at the western end of this hill garnet-bearing quartzose gneiss predominates. Some of these garnet-bearing gneisses contain cordierite and/or sillimanite and there is also garnet-quartzite. Both the mafic granulite and the garnet-bearing gneisses are in part migmatized. The three hills north of the track all consist of garnet-bearing gneiss, with minor to rare mafic granulite. Many of these garnet gneisses also contain sillimanite and some contain cordierite.

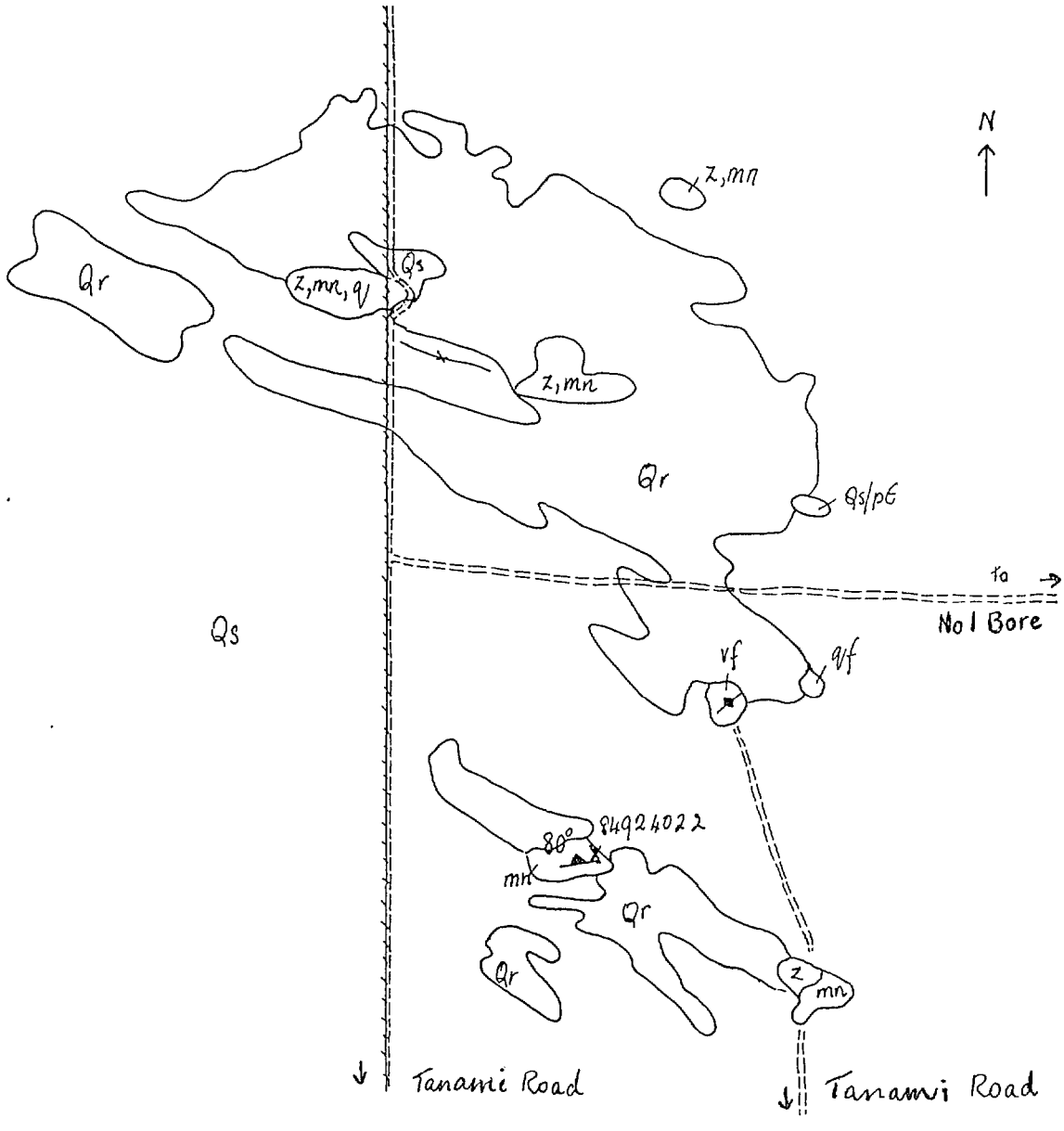

Figure 6. Distribution of rock units west of No 1 Bore, Anburla. Scale approx 1:80 000. mn mafic granulite, q metaquartzite, qf quartzofeldspathic gneiss, vf garnetiferous quartzofeldspathic gneiss z sillimanite-bearing gneiss.

Outcrops in the northernmost hill show two phases of folding: an early near-isoclinal fold generation with upright, steeply plunging axial traces is folded by a second generation of open, shallowly plunging folds. Shallowly plunging lineations in the mafic granulites may be related to the second generation.

The metamorphic grade is granulite, but biotite is locally very abundant, particularly in the garnet-bearing rocks. Late hydration appears to have been locally intense. Co-existing garnet and cordierite have *mg* of 35 and 83.5 respectively. These values are similar to those at the Edwards Creek Prospect in the northern Strangways Range where the pressure was estimated as 7-8 kbars (Warren, 1982). The high TiO_2 content of the biotite (3.13-5.15 weight percent at *mg* 69) indicates high temperature.

These outcrops are best correlated with the metapelites interlayered with mafic granulites that crop out between Anburla Creek and Valley Bore to the southeast. They appear more iron-rich than the Lander Rock Beds to the north, but less aluminous and less iron-rich than the Harts Range Group.

(e) Outcrops in the Rembrandt Rock - Wirmbrandt Rock area

Outcrops in the Rembrandt Rock - Wirmbrandt Rock area are almost entirely granite, with minor xenoliths and small rafts of metasediments and quartzofeldspathic gneiss.

Rembrandt Rock is a large exfoliated tor of leucocratic granite with rare K feldspar crysts (to 3 cms) in a medium-grained matrix of lilac quartz, pale pink K feldspar, plagioclase and minor biotite (labeled Eg_3 in Fig. 7). The outcrops include a body of fine-grained leucogneiss on the northeast side of the hill. The lower hills to the north contain coarse-grained megacrystic granite (Eg_1) consisting of large (to 10 cm) rounded K feldspar crysts set in a coarse matrix of lilac quartz, black biotite, plagioclase and pale pink K feldspar. The elongate hill 5 km northwest of Rembrandt Rock consists mainly of the megacrystic phase, but also contains a finer-grained less mafic phase at the eastern end. Xenoliths include sillimanite-bearing metasediments, garnet quartzite, fine-grained quartzofeldspathic gneiss or orthogneiss (84924078). The southern part of Wirmbrandt Rock and nearby tors consist of a medium-

grained megacrystic granite (Eg_2) crowded with sub-hedral K feldspar laths to about 4 cm in a matrix of grey quartz, abundant biotite, plagioclase, K feldspar and rare garnet. This unit carries small (to 10 cm) xenoliths of fine-grained slightly foliated mafic rock. The northern part of Wirmbrandt Rock consists of the same coarse megacrystic gneiss as crops out to the northeast.

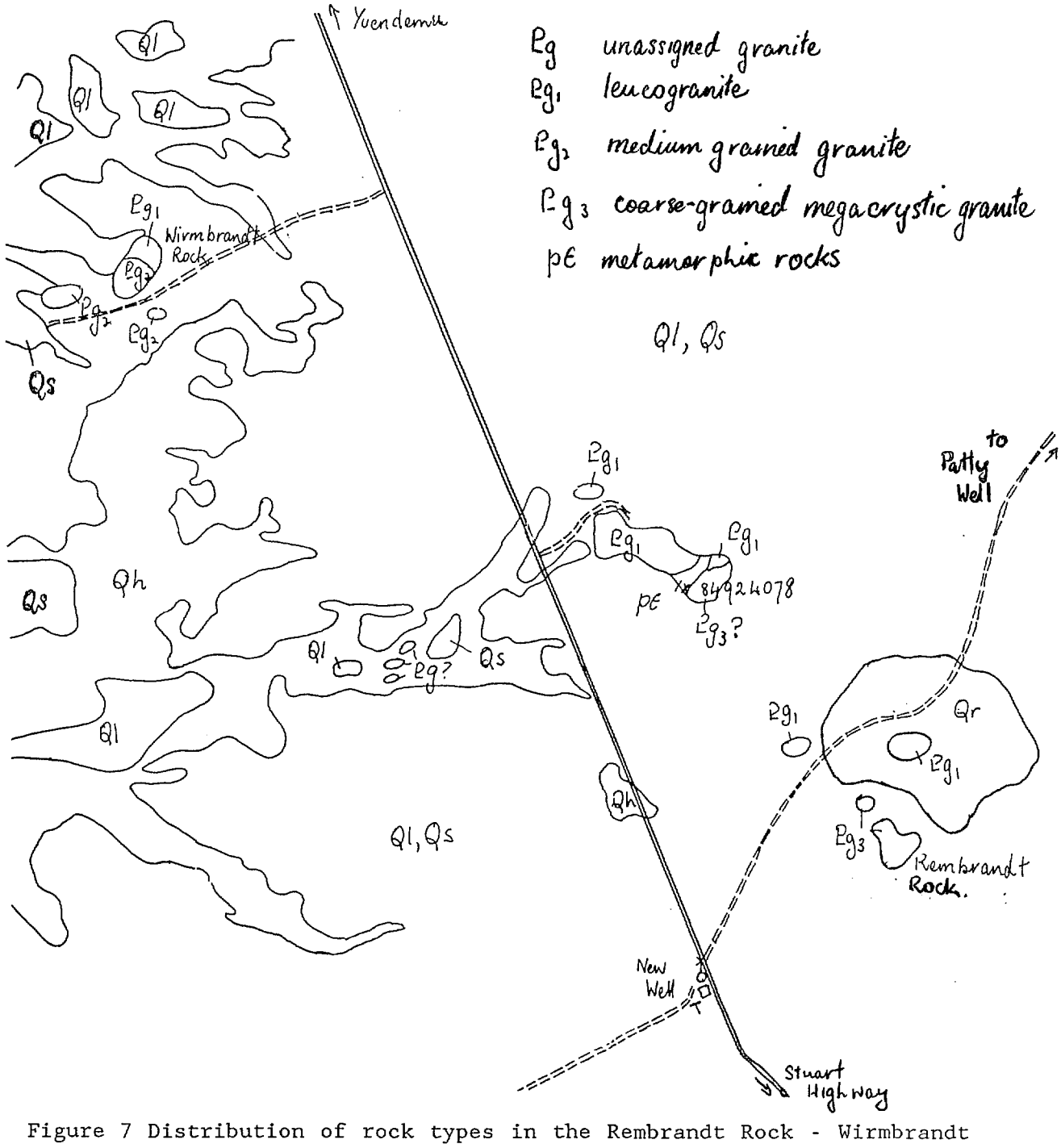

Figure 7 Distribution of rock types in the Rembrandt Rock - Wirmbrandt Rock area. Scale approx 1:80 000.

All the granites are metamorphosed. The metamorphic grade is amphibolite. Co-existing garnet and cordierite have *mg* of 12.6 and 65.2

respectively. Pressure is therefore estimated as being in the 3-4 kbar range, at an high-enough temperature to stabilize sillimanite. A relic early quartz-spinel assemblage in cordierite-bearing rocks also indicates high temperatures.

The granites in the Rembrandt Rock district may form a single suite. Eg_2 ressembles the late enriched granites that occur along the northern margin of the Ngalia Basin, but the specimen that was collected lacks allanite, which characterizes such granites.

(f) Hill 9 km north of Joker Bore

The small hill 9 km north of Joker Bore consists of metamorphic rocks intruded by a dark biotite-rich granite and by small bodies of leucogranite. The metamorphic rocks include quartzofeldspathic gneiss, biotite-quartzofeldspathic gneiss, meta-pelites with garnet, sillimanite and cordierite, and rare quartzose and calc-silicate rocks. Only one mafic rock was located: a small pod of dark norite with biotite and late hornblende. Muscovite occurs in some of the metasediments and in both metasediments and granite at the northern end of the hill.

The granite and the sediments are deformed. The foliation dips shallowly to the north, and the strongly developed lineations plunge shallowly to the east. These outcrops are unusual in the Arunta Block, dips and lineations are more commonly steep.

The metamorphic grade is lower amphibolite. Co-existing cordierite and garnet have *mg* of 68 and 15.6, indicating pressure slightly higher than at Rembrandt Rock. The TiO_2 content of biotite is low (approx. 3 weight percent at *mg* 46), suggesting lower temperatures than at Rembrandt Rock, though hornblende in 84924005B is brown, generally indicative of high temperature. The muscovite, occurring close to a minor shear zone in the centre of the hill, and at the northern edge, another possible fracture trace, is considered to be a product of late local retrogression.

The metasediments are considered to be Division 2 or uppermost Division 1. The megacrystic granite contains more biotite than the megacrystic granite near Rembrandt Rock, but is tentatively correlated with it. Outcrops were too weathered for analysis.

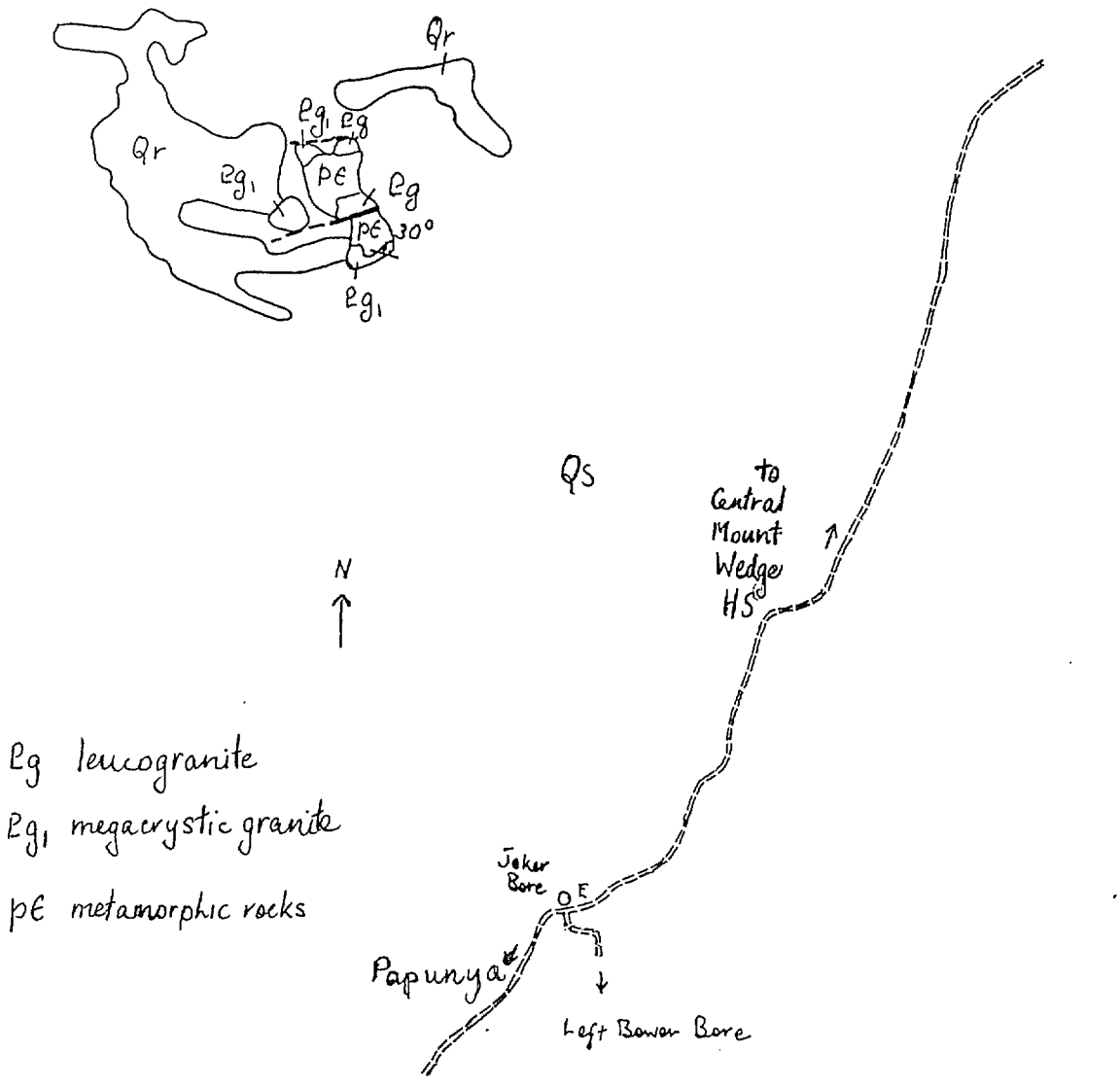

Figure 8. Distribution of Rock types in the outcrops 9 km north of Joker Bore. Scale approx 1:80 000.

(g) Stuart Bluff Granite

Granite in core from BMR Napperby No 8 has been analysed (86924346, Appendix 1). It is a megacrystic pink poorly-foliated coarse-grained unit which in thin section contains abundant K feldspar, altered plagioclase, quartz, biotite, almost entirely replaced by chlorite, and minor muscovite. The K feldspar is perthitic orthoclase which has partly inverted to microcline. The fine-grained minerals replacing plagioclase include white mica, clinozoisite and calcite. Fluorite occurs in a vein in the core, but not in the thin section from the interval taken for chemical analysis. The metamorphic grade is greenschist, possibly

prograde, rather than retrograded from higher conditions. This granite is similar to the leucogranite in the Rembrandt Rock district to the southeast.

ACKNOWLEDGEMENTS

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APPENDIX 1

Analyses of rocks collected in 1984, 1985 & 1986

Sample number	84094023	84094034	84094035	84094036	84094037
Lithology	charnocki.	quartzofe. gneiss (ortho	quartzofe. gneiss (ortho	quartzofe. gneiss (ortho	quartzofe. gneiss
Map name	Narwietoo.	MacDonnell Ranges	MacDonnell Ranges	MacDonnell Ranges	MacDonnell Ranges
Grid reference	787429	302718	300740	309747	264746
SiO2	60.87	70.58	77.62	72.46	71.22
TiO2	1.34	.43	.10	.28	.33
Al2O3	14.81	13.70	12.25	13.97	14.85
Fe2O3	2.47	1.94	.56	1.07	1.38
FeO	7.27	1.20	.16	.68	.78
MnO	.11	.12	.05	.04	.05
MgO	2.68	1.01	.09	.60	.71
CaO	4.88	2.14	.26	2.06	2.55
Na2O	2.19	2.74	3.95	3.27	4.01
K2O	1.94	4.56	4.26	4.65	3.69
P2O5	.21	.11	.01	.05	.07
LOI	1.05	1.07	.55	.84	-
Rest	.28	.21	.10	.20	.21
Total	100.10	99.81	99.96	100.17	99.85
O=F,S,Cl	.00	.00	.00	.00	.00
Total	100.10	99.81	99.96	100.17	99.84
Trace elements in parts per million					
Ba	704	668	123	697	792
Li	18	34	10	18	-
Rb	92	225	308	211	162
Sr	168	107	21	223	274
Pb	15	34	24	25	22
Th	31	20	23	26	24
U	.50	6.50	4.00	3.00	3.00
Zr	355	176	82	136	146
Nb	18	16	18	11	11
Y	30	44	51	31	28
La	86	46	27	57	47
Ce	157	97	56	105	91
Nd	54	35	19	32	30
Sc	30	13	<2	7	-
V	164	45	<2	21	28
Cr	54	19	2	3	4
Co	26	10	3	5	-
Ni	23	18	6	6	-
Cu	29	27	6	<2	-
Zn	123	62	29	32	-
Sn	2	3	4	3	3
W	3	20	7	4	5
Mo	<3	<3	<3	3	3
Ga	21	13	16	14	14
As	.50	<.50	<.50	.50	.50
S	-	-	-	-	100
Be	2	3	5	2	-
Bi	<2	2	<2	<2	-

Sample number	84094038	84094040	84094041	84094054	84094055
Stratigraphic unit				Dneiper Granite	Mount Swan Granite
Lithology	quartzofe. gneiss (ortho	quartzofe. gneiss (ortho	garnet-bearing leucogran.	granite gneissic	granite
Map name	MacDonnell Ranges	MacDonnell Ranges	MacDonnell Ranges	Dneiper	MacDonald Downs
Grid reference		217746	215739	045096	100119
SiO2	71.82	73.47	74.39	69.72	69.36
TiO2	.31	.22	.10	.71	.59
Al2O3	14.28	13.30	14.29	13.30	13.70
Fe2O3	1.38	.92	.66	2.68	1.85
FeO	.61	.61	.32	2.11	2.44
MnO	.04	.04	.06	.06	.06
MgO	.64	.53	.27	.97	.63
CaO	2.17	1.42	1.51	2.36	2.08
Na2O	3.33	3.69	3.80	2.65	2.48
K2O	4.41	4.23	3.55	4.55	5.93
P2O5	.07	.05	.05	.16	.18
LOI	.84	1.15	1.28	1.03	1.09
Rest	.20	.16	.19	.21	.34
Total	100.10	99.79	100.47	100.51	100.73

Trace elements in parts per million

Ba	707	425	911	632	542
Li	19	12	21	29	22
Rb	180	217	116	236	534
Sr	241	210	324	93	80
Pb	25	19	19	21	48
Th	27	30	6	26	133
U	4.50	6.00	.50	5.50	25.00
Zr	142	108	65	251	413
Nb	10	12	10	14	37
Y	30	22	15	53	120
La	48	46	25	54	211
Ce	91	80	49	104	393
Nd	29	21	13	38	118
Pr	-	-	-	-	-
Sc	7	4	5	13	12
V	26	20	6	40	24
Cr	4	5	<2	11	3
Co	7	7	3	10	8
Ni	8	8	5	11	7
Cu	2	2	7	7	12
Zn	31	31	26	57	53
Sn	2	2	<2	6	4
W	3	3	2	4	6
Mo	3	3	3	4	3
Ga	14	14	14	17	18
As	<.50	<.50	.50	.50	.50
S	-	-	-	-	-
F	-	-	-	-	-
Cl	-	-	-	-	-
Be	2	2	<1	2	4
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84094056	84094057	84094061A	84094061B
Stratigraphic unit	Perenti Metamorph.	Perenti Metamorph.		
Lithology	charnocki.	Sillimani. gneiss	granite	granite
Map name	MacDonald Downs	MacDonald Downs	Dneiper	Dneiper
Grid reference	076117	076119	134003	134003
SiO2	65.30	61.71	64.64	72.00
TiO2	1.05	.75	1.11	.33
Al2O3	13.30	19.18	13.28	13.71
Fe2O3	2.65	3.15	2.75	1.12
FeO	4.44	3.99	4.86	1.51
MnO	.10	.06	.10	.03
MgO	1.50	2.38	1.52	.74
CaO	2.78	.54	3.78	1.71
Na2O	2.86	1.10	2.48	2.85
K2O	4.32	5.08	3.78	5.05
P2O5	.26	.11	.27	.09
LOI	.86	1.93	1.62	1.15
Rest	.22	.20	.22	.19
Total	99.64	100.18	100.41	100.48

Trace elements in parts per million

Ba	657	391	.539	565
Li	14	42	22	19
Rb	190	363	204	263
Sr	62	32	109	130
Pb	12	6	23	41
Th	15	21	26	36
U	2.50	4.50	5.50	8.00
Zr	361	162	281	155
Nb	16	17	16	10
Y	62	34	62	27
La	51	49	54	58
Ce	98	93	107	103
Nd	38	41	40	28
Pr	-	-	-	-
Sc	18	14	20	7
V	60	84	75	31
Cr	14	104	19	17
Co	16	22	17	9
Ni	11	39	11	9
Cu	3	3	18	<2
Zn	66	45	89	36
Sn	4	6	8	5
W	5	3	6	5
Mo	4	<3	5	<3
Ga	17	25	17	16
As	.50	<.50	4.00	2.00
S	-	-	-	-
F	-	-	-	-
Cl	-	-	-	-
Be	3	5	3	4
Bi	<2	1	2	<2
Hf	-	-	-	-
Ta	-	-	-	-
Cs	-	-	-	-

Sample number	84094062	84094064A	84094066	84094067	84094068
Stratigraphic unit	Pgk	Dneiper Granite	Cackleber. Metamorph.	Pgk	eq Pgk?
Lithology	granite	granite	amphiboli.	granite	granite
Map name	Dneiper	Dneiper	Dneiper	Dneiper	Dneiper
Grid reference	298026	303043	362976	369965	370961
SiO2	73.21	69.34	48.21	71.45	67.32
TiO2	.26	.64	.62	.39	.73
Al2O3	13.75	13.45	14.97	13.27	13.62
Fe2O3	1.02	2.31	1.67	1.59	2.14
FeO	1.11	2.02	8.89	1.60	2.89
MnO	.02	.06	.18	.03	.06
MgO	.40	.89	9.79	.50	1.12
CaO	1.54	2.36	13.41	1.54	2.24
Na2O	2.99	2.33	1.13	2.46	2.37
K2O	4.95	4.77	.35	5.58	5.36
P2O5	.06	.16	.06	.13	.25
LOI	.61	.98	1.01	1.00	1.22
Rest	.19	.29	.28	.35	.33
Total	100.11	99.60	100.57	99.89	99.65
O=F,S,Cl	.00	.03	.00	.03	.00
Total	100.11	99.57	100.57	99.85	99.65

Trace elements in parts per million

Ba	394	690	105	526	795
Li	35	26	17	47	57
Rb	336	241	18	349	365
Sr	83	109	131	92	139
Pb	50	30	4	42	28
Th	86	29	1	105	64
U	9.50	6.00	<.50	12.00	4.00
Zr	207	242	18	295	396
Nb	13	15	<1	16	23
Y	44	50	15	41	72
La	80	63	2	160	164
Ce	142	119	13	302	299
Nd	37	42	7	94	90
Pr	-	-	3	-	-
Sc	5	12	52	7	13
V	13	37	259	17	48
Cr	3	13	917	5	12
Co	6	13	54	11	12
Ni	6	9	196	3	11
Cu	<2	3	2	6	18
Zn	36	59	70	45	62
Sn	6	6	2	3	8
W	3	4	<2	3	3
Mo	<3	<3	<3	<3	4
Ga	17	17	15	15	17
As	<.50	.50	1.00	.50	.50
S	-	-	10.00	-	-
F	-	700	<100	800	-
Cl	-	-	54	-	-
Be	4	3	1	4	5
Bi	<2	<2	<1	<2	<2
Hf	-	-	<2	-	-
Ta	-	-	<2	-	-
Cs	-	-	7	-	-

Sample number	84094069	84094070	84094071	84094072B	84094073A
Stratigraphic group			Bonya		
Stratigraphic unit	Pgc	Pgc	Bonya Metamorph.	Jervois Granite	Jervois Granite
Lithology	granite	granite	quartzofe. gneiss	granite	granite (hbe tonalite)
Map name	Dneiper	Dneiper	Jervois Range	Jervois Range	Jervois Range
Grid reference	434917	448904	093855	475822	504851
SiO2	74.85	72.11	71.56	74.04	57.66
TiO2	.36	.51	.50	.06	1.01
Al2O3	12.42	12.50	11.98	13.71	16.84
Fe2O3	1.67	2.54	2.28	.50	3.03
FeO	.96	1.32	2.94	.18	5.02
MnO	.03	.05	.02	.01	.11
MgO	.39	.49	.61	.18	2.71
CaO	1.20	1.68	1.57	1.00	5.38
Na2O	2.79	2.77	1.60	2.86	3.14
K2O	4.67	5.00	5.26	6.15	2.42
P2O5	.05	.09	.10	.03	.22
LOI	.67	.82	1.47	.84	2.25
Rest	.28	.30	.22	.13	.18
Total	100.34	100.18	100.11	99.69	99.97
O=F,S,Cl	.03	.03	.00	.00	.00
Total	100.32	100.15	100.11	99.69	99.97

Trace elements in parts per million

Ba	787	793	805	278	368
Li	13	8	16	10	13
Rb	225	222	230	274	127
Sr	67	78	37	100	245
Pb	24	21	6	66	13
Th	34	28	28	29	8
U	5.00	5.50	5.50	9.50	2.50
Zr	286	324	344	67	229
Nb	15	16	18	7	12
Y	58	63	83	39	33
La	66	59	28	31	29
Ce	123	120	62	62	57
Nd	45	41	25	18	24
Pr	-	-	-	-	-
Sc	8	11	13	3	27
V	9	10	17	2	121
Cr	4	3	10	2	24
Co	9	10	10	7	24
Ni	3	2	7	3	7
Cu	2	4	4	25	<2
Zn	38	49	8	17	29
Sn	8	8	6	<2	2
W	5	5	7	4	2
Mo	<3	3	3	<3	4
Ga	14	15	17	15	20
As	.50	<.50	.50	<.50	1.00
S	-	-	-	-	-
F	600	700	-	<200	-
Cl	-	-	-	-	-
Be	4	4	2	4	3
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84094073B	84094074	84094075	84094076
Stratigraphic unit	Jervois Granite	Jervois Granite	Jervois Granite	Jervois Granite
Lithology	granite	granite	granite	granite
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	504851	264857	269853	273849
SiO2	71.85	68.81	68.56	68.31
TiO2	.17	.44	.45	.51
Al2O3	14.65	14.60	14.50	14.50
Fe2O3	.78	1.52	1.70	1.56
FeO	.92	2.56	2.48	3.20
MnO	.03	.07	.07	.08
MgO	.53	.95	.86	.97
CaO	1.99	2.29	2.24	2.44
Na2O	3.73	3.08	3.27	3.23
K2O	3.84	4.29	3.97	3.64
P2O5	.06	.16	.17	.20
LOI	1.09	1.47	1.39	1.53
Rest	.18	.22	.22	.23
Total	99.82	100.46	99.88	100.40

Trace elements in parts per million

Ba	560	726	629	637
Li	56	61	58	58
Rb	95	198	197	195
Sr	357	101	99	103
Pb	17	24	27	23
Th	6	21	26	28
U	1.50	4.00	3.50	2.50
Zr	91	224	258	285
Nb	5	12	14	15
Y	13	58	68	80
La	19	53	60	65
Ce	34	95	118	127
Nd	12	37	45	49
Pr	-	-	-	-
Sc	6	12	14	16
V	11	24	20	24
Cr	5	10	8	9
Co	8	10	10	10
Ni	17	8	8	9
Cu	19	7	5	7
Zn	92	60	58	70
Sn	<2	4	4	5
W	3	4	4	6
Mo	3	3	4	3
Ga	16	17	17	18
As	.50	1.00	.50	1.00
S	-	-	-	-
F	<200	-	-	-
Cl	-	-	-	-
Be	4	3	4	3
Bi	<2	<2	<2	<2
Hf	-	-	-	-
Ta	-	-	-	-
Cs	-	-	-	-

Sample number	84904047	84904048	84904049	84904050	84904051
Stratigraphic unit	Woodgreen Granite	Woodgreen Granite	Copia Granite	Mount Ida Granite	Copia Granite
Lithology	granite (megacrys.	granite fine grained	granite gneissic	granite	granite
Map name	Woodgreen	Woodgreen	Utopia	Utopia	Utopia
Grid reference	350170	350170	660140	680170	660170
SiO2	62.85	75.32	68.88	73.85	75.95
TiO2	1.02	.28	.63	.18	.27
Al2O3	14.59	12.71	14.17	12.96	11.71
Fe2O3	3.50	.80	1.53	.75	1.60
FeO	2.93	.55	2.85	1.19	.98
MnO	.08	.02	.05	.01	.03
MgO	1.84	.48	.97	.24	.13
CaO	3.83	1.86	2.01	1.07	.76
Na2O	2.50	2.15	2.41	2.26	2.41
K2O	4.39	5.05	5.13	6.42	5.40
P2O5	.34	.04	.16	.06	.03
LOI	1.31	.65	1.03	.94	.55
Rest	.37	.19	.24	.17	.22
Total	99.55	100.10	100.06	100.10	100.04
O=F,S,Cl	.00	.00	.00	.00	.00
Total	99.55	100.10	100.06	100.10	100.04

Trace elements in parts per million

Ba	1240	582	845	279	923
Li	19	4	41	17	20
Rb	247	210	223	368	202
Sr	328	180	133	48	62
Pb	32	47	19	64	21
Th	44	113	24	99	23
U	5.00	13.00	2.50	39.00	2.00
Zr	287	250	238	197	286
Nb	23	3	24	19	9
Y	62	9	39	26	27
La	129	35	74	57	59
Ce	233	69	132	105	116
Nd	76	20	46	30	41
Pr	-	-	-	-	-
Sc	18	4	12	6	10
V	101	11	44	7	2
Cr	19	5	14	<2	<2
Co	17	5	9	6	6
Ni	17	6	12	3	<2
Cu	25	<2	<2	2	4
Zn	87	24	46	33	47
Sn	11	<2	6	2	3
W	4	3	3	4	2
Mo	5	<3	4	3	<3
Ga	19	13	16	14	13
As	.50	<.50	<.50	1.00	.50
S	-	-	-	.01	-
F	-	-	-	-	<200
Cl	-	-	-	-	-
Be	3	2	2	<1	3
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84904052	84904059A	84904059B	84904060
Stratigraphic group		Strangways Metamorph. Complex	Strangways Metamorph. Complex	Strangways Metamorph. Complex
Stratigraphic unit	Copia Granite	Kanandra Granulite	Kanandra Granulite	Kanandra Granulite
Lithology	granite	granulite	mafic granulite	garnet quartzofe. gneiss
Map name	Utopia	Delny	Delny	Delny
Grid reference	661170	910850	910850	910870
SiO2	71.24	58.11	48.30	73.16
TiO2	.65	1.53	.67	.25
Al2O3	13.06	14.29	17.66	13.98
Fe2O3	2.20	4.81	1.87	.54
FeO	1.75	4.77	7.38	1.40
MnO	.06	.10	.16	.03
MgO	.76	1.92	7.27	.59
CaO	2.62	5.30	11.69	1.27
Na2O	2.88	2.09	2.00	2.23
K2O	3.91	4.32	.79	6.32
P2O5	.14	.70	.19	.07
LOI	.88	1.78	1.98	.33
Rest	.22	.54	.28	.16
Total	100.37	100.26	100.24	100.33

Trace elements in parts per million

Ba	647	2981	825	564
Li	21	3	10	8
Rb	176	81	18	234
Sr	75	315	342	118
Pb	16	19	14	46
Th	27	1	6	26
U	3.50	.50	1.00	2.50
Zr	322	347	88	119
Nb	17	20	<2	5
Y	64	83	19	22
La	62	80	52	39
Ce	121	211	85	78
Nd	43	106	21	24
Pr	-	-	-	-
Sc	13	27	38	4
V	20	125	180	19
Cr	8	<2	196	9
Co	7	21	43	7
Ni	8	2	142	8
Cu	104	19	59	<2
Zn	42	93	65	29
Sn	9	4	<2	<2
W	5	4	<2	4
Mo	3	<3	5	3
Ga	15	18	15	14
As	<.50	.50	1.00	<.50
S	-	-	-	-
F	-	-	-	-
Cl	-	-	-	-
Be	3	2	1	1
Bi	<2	<2	<2	<2
Hf	-	-	-	-
Ta	-	-	-	-
Cs	-	-	-	-

Sample number	84914042	84914043	84914045	84914128	84914130
Stratigraphic unit	Burt Bluff Gneiss		eq Burt Bluff	Oolbra Orthognei.	Wiluma granitoid
Lithology	granite	quartzofe. gneiss (grey	quartzofe. gneiss (porph	quartzofe. gneiss (ortho	granite
Map name	Alice Springs	Alice Springs	Alice Springs	Burt	Burt
Grid reference	634717	498874		996248	926372
SiO2	69.63	69.87	66.74	71.92	71.28
TiO2	.40	.48	.81	.40	.32
Al2O3	14.88	14.56	14.20	13.22	14.35
Fe2O3	1.40	1.40	2.25	1.14	.90
FeO	1.18	1.52	3.00	2.29	1.56
MnO	.07	.02	.08	.04	.01
MgO	.86	.73	1.19	.57	.71
CaO	2.47	2.09	3.66	1.93	2.20
Na2O	3.37	2.88	2.54	2.41	2.90
K2O	4.58	5.16	4.25	5.13	4.56
P2O5	.10	.15	.25	.12	.11
LOI	.86	1.03	1.07	.65	.98
Rest	.21	.38	.29	.20	.39
Total	100.01	100.27	100.33	100.02	100.27
	Trace elements in parts per million				
Ba	741	1501	1191	582	2044
Li	23	9	22	15	6
Rb	223	161	169	255	141
Sr	217	345	222	94	120
Pb	27	32	26	27	33
Th	27	73	24	34	63
U	4.00	1.00	3.00	4.00	4.50
Zr	164	384	276	196	309
Nb	11	7	13	14	9
Y	35	12	42	34	42
La	41	178	69	84	132
Ce	75	291	123	155	237
Nd	25	78	45	49	63
Sc	9	7	17	10	7
V	34	37	62	24	23
Cr	3	7	7	8	4
Co	7	7	14	10	8
Ni	6	8	9	7	4
Cu	9	11	8	4	2
Zn	42	48	71	51	39
Sn	2	<2	3	<2	2
W	4	<2	3	2	2
Mo	4	3	4	3	4
Ga	13	17	17	16	16
As	1.00	<.50	.50	<.50	<.50
Be	1	2	3	2	2
Bi	<2	<2	<2	<2	<2

Alice Springs

Sample number	84914131	84914144	85914290A	85914290B
Stratigraphic unit	Gumtree Granite	Alice Springs Granite	Alice Springs Granite	Alice Springs Granite
Lithology	granite	granite	granite	granite
Map name	Laughlen	Alice Springs	Alice Springs	Alice Springs
Grid reference	996282	874837	836833	836833
SiO2	69.49	73.14	71.55	73.26
TiO2	.46	.20	.20	.21
Al2O3	14.18	14.98	15.66	14.99
Fe2O3	1.56	.75	.60	.68
FeO	1.48	.73	.79	.81
MnO	.03	.03	.04	.04
MgO	.71	.45	.34	.37
CaO	2.17	2.00	2.12	2.04
Na2O	2.90	4.42	4.65	4.43
K2O	5.33	2.77	2.75	2.54
P2O5	.15	.05	.06	.05
LOI	.77	.58	.88	.85
Rest	.57	.24	.20	.19
Total	99.80	100.34	99.84	100.46
O=F,S,Cl	.00	.02	.00	.00
Total	99.80	100.32	99.84	100.46

Trace elements in parts per million

Ba	2703	638	674	577
Li	7	34	56	56
Rb	244	107	100	95
Sr	469	515	524	497
Pb	55	18	18	18
Th	69	9	7	6
U	5.00	1.50	1.00	1.00
Zr	373	100	105	107
Nb	25	5	5	6
Y	43	13	12	11
La	274	24	20	20
Ce	433	49	36	38
Nd	96	15	14	15
Pr	-	-	<3	<3
Sc	7	6	4	4
V	28	12	11	12
Cr	2	4	<2	2
Co	9	8	6	6
Ni	5	5	<2	<2
Cu	7	3	2	2
Zn	50	33	31	34
Sn	3	<2	2	<2
W	3	2	3	4
Mo	4	3	<3	<3
Ga	17	18	19	18
As	1.00	.50	.50	<.50
S	-	100	<100	<100
F	-	400	-	-
Be	3	3	4	4
Bi	<2	<2	<1	1
Cs	-	-	<3	<3

Sample number	84924010	84924030	84924078	84924081	84924085
Stratigraphic unit				Napperby Orthognei.	Napperby Orthognei.
Lithology	quartzofe. gneiss (?meta	granite	quartzofe. gneiss	quartzofe. gneiss (grey	granite micro
Map name	Aileron	Napperby	Napperby	Reynolds Range	Napperby
Grid reference	338690	640570	615610	609133	832071
Other data			large xenolith		
SiO2	70.58	75.39	70.81	72.84	72.03
TiO2	.56	.34	.57	.36	.29
Al2O3	13.04	12.26	13.31	13.29	13.89
Fe2O3	1.47	.92	1.27	.72	.99
FeO	2.04	1.14	2.76	1.84	1.28
MnO	.04	.02	.05	.03	.01
MgO	.83	.40	.94	.51	.41
CaO	2.14	1.18	2.12	1.66	1.38
Na2O	2.25	2.34	2.15	2.16	2.28
K2O	5.38	5.44	4.70	5.27	6.32
P2O5	.12	.06	.15	.12	.12
LOI	.88	.62	1.11	.77	1.07
Rest	.22	.17	.37	.21	.23
Total	99.55	100.28	100.31	99.78	100.30
O=F,S,Cl	.00	.00	.06	.00	.00
Total	99.55	100.28	100.25	99.78	100.30

Trace elements in parts per million

Ba	618	188	700	751	273
Li	20	29	22	19	16
Rb	330	383	269	289	428
Sr	83	37	110	83	53
Pb	32	39	35	32	66
Th	43	85	29	31	192
U	9.00	8.50	1.50	3.50	17.00
Zr	240	189	216	178	248
Nb	15	12	13	10	13
Y	51	27	43	44	43
La	62	94	58	48	152
Ce	123	178	114	97	286
Nd	40	51	41	32	82
Pr	-	-	-	-	-
Sc	11	6	10	7	5
V	44	15	49	22	13
Cr	11	4	18	9	3
Co	12	6	13	7	6
Ni	5	8	8	9	8
Cu	6	<2	5	8	2
Zn	49	38	59	39	39
Sn	8	<2	3	4	9
W	5	3	3	3	2
Mo	<3	<3	4	3	<3
Ga	15	15	15	15	17
As	.50	<.50	<.50	<.50	<.50
S	-	-	-	-	-
F	-	-	1500	-	-
Cl	-	-	-	-	-
Be	4	2	4	3	2
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84924088	84924096	84924097	84924098	84924099
Stratigraphic unit	Napperby Orthognei.	Aileron Metamorph.	Boothby Granite	Aileron Metamorph.	Boothby Orthognei.
Lithology	granite	granite micro	granite (sheared)	quartzofe. gneiss (grey	granite
Map name	Aileron	Aileron	Aileron	Aileron	Aileron
Grid reference	937056	254897	284108	284108	280053
SiO2	73.13	72.77	72.03	67.20	74.12
TiO2	.40	.49	.47	1.11	.29
Al2O3	13.37	12.74	13.18	13.08	13.22
Fe2O3	1.16	1.64	1.34	3.58	.66
FeO	1.44	1.44	1.76	2.92	1.51
MnO	.01	.03	.03	.07	.02
MgO	.52	.46	.72	1.08	.49
CaO	1.60	1.56	1.48	2.87	1.41
Na2O	3.00	1.78	1.93	2.40	2.19
K2O	4.34	6.41	5.70	4.37	5.63
P2O5	.15	.08	.09	.32	.12
LOI	.78	.44	.96	1.01	.57
Rest	.25	.24	.33	.38	.18
Total	100.15	100.08	100.02	100.39	100.41
O=F,S,Cl	.03	.00	.05	.06	.00
Total	100.12	100.08	99.96	100.33	100.41

Trace elements in parts per million

Ba	702	193	456	693	467
Li	10	7	11	21	50
Rb	230	595	378	229	365
Sr	78	33	73	165	66
Pb	18	48	38	31	35
Th	27	140	55	30	34
U	4.00	29.00	4.00	3.50	6.50
Zr	188	286	194	285	146
Nb	12	15	12	18	9
Y	47	90	46	44	41
La	41	120	62	59	37
Ce	84	230	123	124	77
Nd	32	68	42	48	26
Pr	-	-	-	-	-
Sc	8	9	8	12	6
V	24	26	41	56	20
Cr	11	3	17	13	10
Co	11	8	12	17	7
Ni	6	7	7	8	10
Cu	<2	2	5	7	9
Zn	12	33	43	90	35
Sn	8	9	8	5	7
W	4	6	5	2	3
Mo	3	<3	3	4	3
Ga	16	15	16	20	16
As	<.50	<.50	<.50	.50	<.50
S	-	-	-	-	-
F	600	-	1300	1400	-
Cl	-	-	-	-	-
Be	4	3	3	4	3
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84924100	84924102A	84924102B	84924103	84924105
Stratigraphic unit	Aileron Metamorph.	Boothby Orthognei.	Boothby Orthognei.	Pgp mapped as Boothby	Aileron Metamorph.
Lithology	quartzofe. gneiss (migma	granite	granite	granite	charnocki.
Map name	Aileron	Aileron	Aileron	Aileron	Aileron
Grid reference	254023	330919	330919	263977	284908
SiO2	68.36	73.84	73.69	71.55	67.63
TiO2	.57	.38	.35	.25	.62
Al2O3	15.51	13.02	13.18	14.45	14.20
Fe2O3	1.56	.71	.74	.94	1.83
FeO	2.76	1.96	1.76	.85	3.16
MnO	.05	.03	.02	.01	.06
MgO	1.13	.69	.66	.50	1.65
CaO	4.48	1.62	1.48	1.24	3.38
Na2O	3.78	1.87	1.86	3.08	2.20
K2O	1.20	5.13	5.49	6.02	3.78
P2O5	.13	.12	.12	.16	.16
LOI	1.58	.64	.54	.86	.72
Rest	.11	.18	.19	.28	.31
Total	101.22	100.19	100.08	100.19	99.70
O=F,S,Cl	.00	.00	.00	.02	.04
Total	101.22	100.19	100.08	100.17	99.66

Trace elements in parts per million

Ba	131	595	641	610	788
Li	23	27	24	7	6
Rb	78	250	263	290	187
Sr	167	81	84	168	175
Pb	7	32	34	62	12
Th	2	30	28	84	10
U	1.00	2.00	2.50	11.00	.50
Zr	203	155	143	217	188
Nb	12	9	9	10	9
Y	21	41	39	51	14
La	22	42	41	112	42
Ce	38	87	79	193	80
Nd	12	27	28	50	28
Pr	-	-	-	-	-
Sc	14	7	6	6	18
V	41	29	27	10	81
Cr	8	16	15	3	32
Co	12	9	10	9	17
Ni	9	13	9	6	17
Cu	2	7	9	4	15
Zn	46	39	35	16	56
Sn	5	2	2	6	5
W	3	3	3	2	2
Mo	4	3	3	<3	4
Ga	19	15	14	15	16
As	<.50	4.00	5.00	<.50	<.50
S	-	-	-	-	-
F	-	-	-	500	900
Cl	-	-	-	-	-
Be	3	2	3	1	3
Bi	<2	<2	<2	<2	<2
Hf	-	-	-	-	-
Ta	-	-	-	-	-
Cs	-	-	-	-	-

Sample number	84924106	84924107	84924114	84924115	84924124
Stratigraphic unit	Aileron Metamorph.	Aileron Metamorph.	Harverson Granite	Harverson Granite	Airy Orthognei.
Lithology	mafic granulite	mafic granulite	granite	granite	granite
Map name	Aileron	Aileron	Reynolds Range	Reynolds Range	Reynolds Range
Grid reference	283903	277891	796337	806328	969224
SiO2	50.76	50.22	75.94	75.28	72.54
TiO2	.73	1.35	.20	.20	.31
Al2O3	13.19	14.82	12.41	12.70	13.67
Fe2O3	.98	2.02	.62	.55	.78
FeO	8.56	10.12	1.34	1.22	1.62
MnO	.16	.17	.03	.02	.02
MgO	11.69	6.49	.35	.37	.60
CaO	9.79	10.72	.88	1.06	1.50
Na2O	1.77	2.13	2.05	2.10	2.10
K2O	1.02	.79	5.13	5.37	5.34
P2O5	.06	.17	.12	.11	.13
LOI	1.37	1.05	.97	.94	.98
Rest	.64	.19	.16	.16	.27
Total	100.72	100.24	100.20	100.08	99.86
O=F,S,Cl	.12	.00	.00	.00	.04
Total	100.60	100.24	100.20	100.08	99.82

Trace elements in parts per million

Ba	93	133	229	380	490
Li	9	17	80	46	33
Rb	44	42	459	356	313
Sr	71	102	45	66	74
Pb	5	5	33	34	35
Th	1	1	24	26	30
U	1.00	1.00	7.50	4.00	3.50
Zr	61	118	99	102	149
Nb	2	8	12	8	9
Y	22	42	50	43	42
La	7	17	25	33	36
Ce	18	37	52	68	77
Nd	7	18	16	23	27
Pr	3	-	-	-	-
Sc	42	45	6	5	5
V	232	295	14	13	24
Cr	1336	164	7	9	13
Co	56	52	6	8	11
Ni	249	63	8	6	11
Cu	120	62	10	8	7
Zn	67	84	42	38	37
Sn	<2	3	13	7	5
W	<2	2	8	5	4
Mo	6	7	3	3	3
Ga	14	19	17	14	16
As	.50	.50	1.00	1.00	<.50
S	1186.00	-	-	-	-
F	1300	-	-	-	1000
Cl	443	-	-	-	-
Be	2	3	3	3	2
Bi	<2	<2	<2	<2	<2
Hf	<2	-	-	-	-
Ta	<2	-	-	-	-
Cs	4	-	-	-	-

Sample number	84924126	84924133C	84924135A	84924139
Stratigraphic unit	Possum Creek Charnocki.	Aileron Metamorph.	Possum Creek Charnocki.	Pgp
Lithology	charnocki.	sillimani. quartzofe.	charnocki.	granite
Map name	Tea Tree	Tea Tree	Tea Tree	Tea Tree
Grid reference	953368	245137	951357	110287
SiO2	67.37	77.64	68.28	72.69
TiO2	.98	.14	1.03	.36
Al2O3	12.72	12.43	12.87	13.05
Fe2O3	1.50	.57	1.61	.85
FeO	4.77	1.01	4.16	2.20
MnO	.07	.01	.06	.03
MgO	1.58	.18	.99	.47
CaO	3.60	.99	2.91	1.70
Na2O	2.03	2.19	1.92	2.24
K2O	4.36	4.33	5.20	5.39
P2O5	.21	.11	.29	.09
LOI	.88	.38	.62	.79
Rest	.22	.10	.26	.26
Total	100.29	100.08	100.20	100.12

Trace elements in parts per million

Ba	464	218	768	431
Li	7	19	13	57
Rb	263	273	223	433
Sr	57	48	58	69
Pb	26	24	31	61
Th	32	17	20	91
U	4.00	3.50	1.50	19.00
Zr	291	77	398	268
Nb	16	6	19	42
Y	70	20	66	150
La	65	23	82	102
Ce	133	46	162	210
Nd	46	15	59	83
Pr	-	-	-	-
Sc	22	3	16	10
V	103	3	76	17
Cr	26	3	9	3
Co	21	6	16	8
Ni	16	4	8	5
Cu	20	3	18	3
Zn	72	34	75	70
Sn	6	9	3	9
W	5	2	4	9
Mo	5	<3	5	<3
Ga	17	18	16	21
As	<.50	<.50	.50	<.50
S	-	-	-	-
F	-	-	-	-
Cl	-	-	-	-
Be	2	<1	2	5
Bi	2	<2	<2	<2
Hf	-	-	-	-
Ta	-	-	-	-
Cs	-	-	-	-

Sample number	85921017	85924153	85924155	85924156A	85924156B
Stratigraphic unit	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.
Lithology	granite	granite micro	granite	granite micro	granite micro
Map name	Napperby	Napperby	Napperby	Napperby	Napperby
Grid reference	616108	864038	864038	859051	859051
SiO2	72.17	71.87	73.08	72.66	72.33
TiO2	.51	.32	.42	.36	.34
Al2O3	13.31	13.48	13.08	13.63	13.73
Fe2O3	4.06	1.34	1.11	1.03	1.24
FeO	<.01	1.65	1.96	1.75	1.48
MnO	.04	.02	.04	.02	.02
MgO	.65	.31	.54	.56	.48
CaO	1.89	1.05	1.55	1.26	1.21
Na2O	2.19	1.91	2.10	2.01	2.07
K2O	4.09	6.64	5.30	5.99	5.99
P2O5	.15	.13	.10	.16	.15
LOI	.80	1.16	.88	1.11	1.11
Rest	.22	.27	.21	.23	.24
Total	100.08	100.15	100.37	100.77	100.39
O=F,S,Cl	.00	.00	.00	.00	.00
Total	100.08	100.14	100.37	100.77	100.39

Trace elements in parts per million

Ba	523	243	489	413	426
Li	35	24	24	14	16
Rb	347	497	394	401	402
Sr	68	46	60	65	65
Pb	27	58	36	49	49
Th	36	174	46	114	113
U	4.50	46.00	6.00	15.00	15.00
Zr	318	269	213	264	256
Nb	21	26	16	19	19
Y	36	102	42	75	74
La	51	130	59	102	107
Ce	97	265	108	197	188
Nd	46	119	49	86	88
Pr	10	32	12	23	24
Sc	7	6	7	6	6
V	27	10	27	16	15
Cr	9	<2	9	4	6
Co	8	5	8	6	6
Ni	4	2	5	3	3
Cu	16	7	10	12	15
Zn	68	54	47	44	43
Sn	15	11	9	12	12
W	5	7	3	5	5
Mo	5	3	3	<3	3
Ga	19	18	16	17	17
As	<.50	<.50	<.50	<.50	<.50
S	<100	100	<100	<100	<100
Be	2	2	4	3	2
Bi	1	<1	2	1	1
Cs	12	4	10	6	6
Ge	-	-	-	-	-

Sample number	85924162C	85924163A	85924163B	85924167	85924172A
Stratigraphic unit	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.
Lithology	deformed granite (quartzof.	granite gneissic	granite micro	granite	granite micro
Map name	Napperby	Napperby	Napperby	Reynolds Range	Reynolds Range
Grid reference	777083	696088	698087	517183	641162
SiO2	72.61	71.51	71.01	70.78	72.96
TiO2	.41	.53	.28	.55	.23
Al2O3	13.29	13.27	13.96	13.30	14.10
Fe2O3	1.21	1.47	1.09	1.31	.81
FeO	1.66	2.28	1.49	2.73	.97
MnO	.03	.04	.02	.06	.02
MgO	.47	.53	.29	.84	.27
CaO	1.59	1.92	1.40	1.97	1.34
Na2O	1.85	2.00	1.94	1.85	2.19
K2O	5.28	5.02	6.80	4.88	6.27
P2O5	.14	.13	.07	.13	.12
LOI	1.09	.81	1.30	1.17	1.00
Rest	.22	.23	.29	.24	.19
Total	99.85	99.74	99.94	99.81	100.47

Trace elements in parts per million

Ba	785	592	356	731	330
Li	26	19	13	60	26
Rb	290	359	447	282	346
Sr	78	66	54	95	58
Pb	34	36	92	29	59
Th	29	48	284	35	120
U	3.50	5.50	55.00	5.50	14.00
Zr	228	336	303	235	196
Nb	12	19	17	13	9
Y	43	41	17	50	35
La	43	69	194	71	71
Ce	77	122	328	125	130
Nd	36	52	126	61	51
Pr	8	14	36	14	13
Sc	7	7	4	10	4
V	20	27	8	39	9
Cr	8	6	<2	17	2
Co	6	8	6	11	5
Ni	4	4	<2	8	3
Cu	11	8	5	12	12
Zn	43	60	49	57	31
Sn	7	6	3	6	18
W	4	3	2	5	4
Mo	<3	4	4	3	3
Ga	15	18	18	16	16
As	<.50	<.50	<.50	.50	<.50
S	<100	<100	<100	<100	<100
Be	3	4	2	4	3
Bi	<1	<1	<1	<1	<1
Cs	6	10	5	14	6
Ge	-	-	-	-	-

Sample number	85924175	85924177A	85924178	85924183A	85924188
Locality	Mount Harris	Mount Harris			Rembrandt Rock
Stratigraphic unit				Napperby Orthognei.	
Lithology	granite micro	granite	quartzofe. gneiss (ortho	granite migmatitic	granite
Map name	Aileron	Napperby	Napperby	Reynolds Range	Napperby
Grid reference	959588	935635	959588	802135	641580
SiO2	72.77	70.48	73.76	72.16	79.96
TiO2	.21	.62	.34	.46	.24
Al2O3	14.05	13.38	12.71	13.17	10.29
Fe2O3	.87	1.94	1.05	1.62	.71
FeO	.88	1.94	1.34	2.22	.76
MnO	.02	.04	.03	.04	.01
MgO	.18	.89	.42	.61	.17
CaO	1.19	2.07	1.40	1.70	.69
Na2O	2.18	1.59	1.91	2.11	1.82
K2O	6.33	4.95	5.39	4.79	4.79
P2O5	.04	.13	.07	.16	.03
LOI	.74	1.18	.81	1.00	.57
Rest	.21	.26	.20	.21	.12
Total	99.67	99.47	99.43	100.25	100.16

Trace elements in parts per million

Ba	456	813	469	636	110
Li	8	8	21	25	21
Rb	375	270	370	323	363
Sr	75	100	62	67	28
Pb	72	37	34	36	36
Th	194	75	50	27	55
U	25.00	6.50	9.00	6.00	6.00
Zr	209	292	190	256	119
Nb	4	14	12	14	10
Y	14	43	56	43	21
La	88	101	69	39	48
Ce	131	172	126	73	93
Nd	41	71	57	33	34
Pr	12	18	14	8	34
Sc	3	8	6	7	3
V	5	42	21	27	7
Cr	<2	10	8	11	2
Co	4	12	6	8	5
Ni	2	8	4	6	3
Cu	5	25	4	4	2
Zn	34	44	31	65	21
Sn	5	7	7	16	2
W	4	5	5	3	<2
Mo	3	3	<3	<3	<3
Ga	18	17	16	17	13
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	<100
Be	1	2	3	2	2
Bi	<1	<1	1	<1	<1
Cs	3	6	7	9	9
Ge	-	-	-	-	-

Sample number	85924189A	85924192	85924193	85924196	85924198A
Stratigraphic unit	Napperby Orthognei.	Lander Rock Beds	Yaningidj. Orthognei.	Napperby Orthognei.	Napperby Orthognei.
Lithology	granite Gamnigmatite	cordierite sillimani.	granite	granite	granite
Map name	Reynolds Range	Tea Tree	Tęa Tree	Aileron	Aileron
Grid reference	996106	073124	080144	093003	047981
SiO2	73.54	77.83	74.36	71.92	72.78
TiO2	.34	.07	.24	.27	.38
Al2O3	13.04	12.49	12.96	14.31	13.24
Fe2O3	.84	.22	1.16	1.36	.92
FeO	1.74	.43	.98	1.08	1.77
MnO	.03	<.01	.03	.02	.03
MgO	.36	.96	.40	.67	.43
CaO	1.34	.40	1.18	1.95	1.42
Na2O	2.34	2.41	2.36	3.64	2.29
K2O	4.98	3.64	5.33	3.13	5.55
P2O5	.13	.08	.09	.04	.12
LOI	.72	.88	.96	.93	.74
Rest	.20	.05	.15	.15	.19
Total	99.60	99.46	100.20	99.47	99.86

Trace elements in parts per million

Ba	780	46	410	350	433
Li	15	8	10	10	36
Rb	241	101	280	166	377
Sr	62	25	101	176	52
Pb	32	10	33	13	36
Th	29	13	30	56	39
U	5.00	7.00	3.00	6.50	5.00
Zr	190	71	125	151	185
Nb	12	4	6	7	12
Y	52	48	51	31	43
La	42	11	32	46	44
Ce	80	24	63	80	83
Nd	36	9	27	28	37
Pr	9	3	8	7	10
Sc	5	<3	5	5	7
V	16	<2	15	25	22
Cr	7	<2	8	4	7
Co	6	3	7	8	8
Ni	4	2	6	4	5
Cu	6	<2	3	9	7
Zn	36	8	33	13	41
Sn	3	6	3	6	15
W	3	5	6	5	5
Mo	<3	3	<3	<3	3
Ga	16	15	15	16	15
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	<100
Be	2	3	2	3	4
Bi	1	-	1	1	1
Cs	<3	<3	<3	4	11
Ge	-	<1	-	-	-

Sample number	85924198B	85924199	85924200	85924203	85924206B
Stratigraphic unit	Napperby Orthognei.	Napperby Orthognei.	Napperby Orthognei.	Yaningidj. Orthognei.	Yaningidj. Orthognei.
Lithology	granite micro	granite micro	granite	granite	granite
Map name	Aileron	Aileron	Aileron	Tea Tree	Tea Tree
Grid reference	045897	032006	993069	121168	043193
SiO2	72.61	69.77	73.80	77.85	73.36
TiO2	.21	.45	.28	.23	.36
Al2O3	13.95	14.23	13.43	11.41	13.45
Fe2O3	.62	.87	.88	.55	.80
FeO	.91	1.99	1.22	1.25	1.87
MnO	.02	.02	.03	.01	.03
MgO	.28	.57	.39	.25	.63
CaO	1.05	1.51	1.45	.79	1.57
Na2O	1.86	2.43	2.72	1.84	2.05
K2O	7.48	6.32	4.57	5.28	5.28
P2O5	.24	.19	.11	.08	.10
LOI	.81	1.16	.91	.54	.64
Rest	.17	.29	.19	.14	.19
Total	100.21	99.80	99.98	100.22	100.33

Trace elements in parts per million

Ba	411	440	658	169	596
Li	24	30	30	48	21
Rb	420	399	308	457	262
Sr	59	92	72	30	82
Pb	55	56	28	31	35
Th	29	174	26	28	34
U	9.50	12.00	4.50	8.20	4.50
Zr	115	355	158	115	177
Nb	7	17	9	9	8
Y	56	42	44	51	38
La	31	170	38	24	43
Ce	61	312	70	45	80
Nd	28	134	32	19	37
Pr	7	36	7	19	9
Sc	4	5	5	3	5
V	7	18	15	10	27
Cr	3	4	6	5	15
Co	5	8	7	5	8
Ni	24	3	5	5	8
Cu	3	6	11	3	9
Zn	23	56	31	35	32
Sn	9	6	16	9	4
W	5	4	10	4	2
Mo	<3	3	<3	<3	<3
Ga	13	19	15	14	16
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	<100
Be	3	3	4	2	3
Bi	<1	1	1	<1	<1
Cs	5	4	9	5	5
Ge	-	-	-	-	-

Sample number	85924208A	85924210	85924211	85924212A	85924213B
Stratigraphic unit	Yaningidj. Orthognei.	Yaningidj. Orthognei.	Airy Orthognei.	Anmatjira Orthognei.	Anmatjira Orthognei.
Lithology	granite	granite	granite	granite	granite
Map name	Tea Tree	Tea Tree	Tea Tree	Reynolds Range	Reynolds Range
Grid reference	043196	995222	273888	797425	
SiO2	77.15	73.76	73.26	73.65	74.74
TiO2	.23	.27	.30	.30	.26
Al2O3	11.61	13.43	13.41	13.00	12.99
Fe2O3	.46	.81	.82	.77	.71
FeO	1.08	1.31	1.58	1.57	1.04
MnO	.02	.03	.03	.02	.01
MgO	.38	.55	.47	.38	.43
CaO	1.25	1.55	1.45	.99	.58
Na2O	1.48	1.79	2.07	2.25	2.54
K2O	5.07	5.16	5.23	5.47	5.34
P2O5	.06	.09	.13	.10	.10
LOI	.65	.87	1.32	1.10	.99
Rest	.12	.18	.18	.18	.17
Total	99.56	99.80	100.25	99.78	99.90

Trace elements in parts per million

Ba	280	682	485	367	268
Li	24	20	47	34	56
Rb	251	242	330	482	528
Sr	72	94	73	48	39
Pb	31	36	33	24	18
Th	15	25	29	35	31
U	3.00	3.50	5.00	13.00	13.00
Zr	115	129	153	136	126
Nb	6	6	10	10	12
Y	24	27	42	46	46
La	22	35	35	34	26
Ce	39	65	68	65	52
Nd	16	28	31	30	23
Pr	4	7	7	7	5
Sc	3	5	6	6	5
V	11	22	18	18	15
Cr	7	13	10	8	9
Co	6	8	8	7	4
Ni	5	8	6	5	4
Cu	3	7	7	4	6
Zn	30	35	38	17	11
Sn	3	2	8	21	36
W	3	3	11	11	12
Mo	3	<3	3	<3	3
Ga	13	14	16	16	16
As	<.50	<.50	1.50	.50	<.50
S	<100	<100	<100	<100	<100
Be	2	3	4	4	4
Bi	<1	<1	<1	1	1
Cs	<3	4	15	17	15
Ge	-	-	-	-	-

Sample number	85924222	85924226A	85924227	85924228	85924229
Stratigraphic unit	Pgp	Pgp	Anmatjira Orthognei.	Anmatjira Orthognei.	Anmatjira Orthognei.
Map symbol	Pgp	Pgp			
Lithology	granite	granite	granite fine grained	granite	granite
Map name	Reynolds Range	Reynolds Range	Reynolds Range	Reynolds Range	Reynolds Range
Grid reference	865593	911504	904437	946407	948402
SiO2	73.34	77.28	74.92	72.36	77.82
TiO2	.25	.08	.30	.47	.23
Al2O3	12.70	12.43	12.65	13.20	11.30
Fe2O3	1.14	.41	.74	.65	.41
FeO	1.64	.68	1.08	2.40	.67
MnO	.06	.03	.02	.03	.01
MgO	.09	.01	.18	.59	.27
CaO	1.31	.85	.97	1.59	.77
Na2O	2.56	2.25	2.05	1.91	1.78
K2O	5.63	5.59	6.59	5.66	5.52
P2O5	.04	.03	.03	.10	.09
LOI	1.09	.59	.74	.69	.62
Rest	.30	.14	.20	.19	.15
Total	100.15	100.37	100.47	99.84	99.64

Trace elements in parts per million

Ba	660	226	136	407	262
Li	64	38	25	38	35
Rb	355	367	650	407	437
Sr	78	45	23	61	51
Pb	39	51	50	36	34
Th	53	19	106	44	31
U	10.00	12.00	19.00	5.00	14.00
Zr	385	83	253	176	108
Nb	43	15	12	12	8
Y	101	114	65	37	55
La	121	29	57	50	24
Ce	233	56	113	92	44
Nd	111	25	46	42	24
Pr	29	6	12	10	6
Sc	9	4	5	7	3
V	<2	<2	9	37	10
Cr	<2	<2	<2	15	4
Co	4	2	4	8	4
Ni	2	<2	<2	5	3
Cu	3	5	3	12	9
Zn	87	35	20	42	23
Sn	-	5	16	8	9
W	7	10	6	3	6
Mo	6	<3	<3	<3	3
Ga	23	20	15	14	12
As	.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	<100
Be	7	4	4	3	4
Bi	1	1	1	<1	1
Cs	8	8	25	16	5
Ge	-	-	-	-	-

Sample number	85090541A	85094174A	85094230	85094231	85094232A
Locality	W Eurolly Bore				
Stratigraphic unit	Jervois Granite ?	Jervois Granite ?	Burt Bluff Gneiss	Burt Bluff Gneiss	Ali Curung Complex
Lithology	migmatitic granite	granite dyke	granite	granite fine grained	granite tonalite
Map name	Jervois Range	Jervois Range	MacDonnell Ranges	MacDonnell Ranges	Crawford
Grid reference	149963	344007	487821	497822	740740
SiO2	70.72	70.02	74.49	74.04	64.35
TiO2	.41	.40	.22	.23	.97
Al2O3	13.41	14.99	12.76	12.75	14.74
Fe2O3	1.91	1.50	1.01	1.06	2.87
FeO	2.62	2.06	1.10	.91	4.86
MnO	.09	.05	.04	.03	.09
MgO	.37	.86	.34	.31	1.63
CaO	2.22	2.68	1.26	.99	3.41
Na2O	2.73	3.59	2.47	1.84	2.78
K2O	3.98	2.58	5.20	6.16	2.94
P2O5	.11	.12	.04	.02	.18
LOI	1.10	1.18	1.05	1.33	1.58
Rest	.25	.21	.17	.16	.25
Total	99.92	100.24	100.15	99.83	100.65
O=F,S,Cl	.00	.00	.00	.00	.00
Total	99.92	100.24	100.15	99.83	100.64

Trace elements in parts per million

Ba	827	672	354	215	535
Li	34	38	43	41	40
Rb	175	132	319	255	211
Sr	89	198	45	41	127
Pb	16	16	37	35	21
Th	28	21	40	68	23
U	3.00	3.00	6.00	9.00	6.00
Zr	331	267	140	136	308
Nb	15	7	13	10	15
Y	106	14	86	48	52
La	83	48	49	112	57
Ce	154	74	95	197	110
Nd	77	29	47	81	54
Pr	18	7	10	23	12
Sc	12	6	6	7	18
V	4	27	15	6	71
Cr	2	7	7	<2	40
Co	6	10	5	5	18
Ni	<2	4	4	<2	13
Cu	8	5	4	3	33
Zn	82	79	33	27	75
Sn	<2	2	3	7	7
W	7	<2	6	5	7
Mo	3	<3	<3	<3	4
Ga	19	20	15	13	19
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	100
Be	3	1	4	3	4
Bi	<1	1	<1	<1	1
Cs	3	9	8	4	26
Ge	-	-	-	-	-

Sample number	85094232B	85094233A	85094233B	85094233C	85094235A
Stratigraphic group					Hatches Creek Group
Stratigraphic unit	Ali Curung Complex	Ali Curung Complex	Ali Curung Complex	Ali Curung Complex	Mount Strzeleck. Volcanics
Map symbol					Phqp
Lithology	granite	granite	granite	granite	meta porphyry
Map name	Crawford	Crawford	Crawford	Crawford	Crawford
Grid reference	740740	780720	770730	770730	950580
SiO2	74.46	76.39	72.65	68.07	70.56
TiO2	.26	.16	.37	.72	.55
Al2O3	12.63	12.03	13.12	13.91	12.78
Fe2O3	1.01	.72	1.69	2.19	2.01
FeO	1.23	.77	1.48	3.56	3.19
MnO	.03	.02	.05	.08	.07
MgO	.32	.07	.56	1.53	.62
CaO	1.19	.68	1.28	2.29	1.74
Na2O	2.28	2.60	2.13	2.47	1.91
K2O	5.46	5.44	5.04	4.19	5.31
P2O5	.07	.02	.10	.23	.14
LOI	1.02	.86	1.31	1.06	.96
Rest	.17	.19	.21	.29	.25
Total	100.13	99.95	99.99	100.59	100.09
O=F,S,Cl	.00	.00	.00	.03	.00
Total	100.13	99.95	99.99	100.56	100.09

Trace elements in parts per million

Ba	478	655	794	649	819
Li	16	10	20	32	15
Rb	224	302	255	217	233
Sr	86	49	84	106	79
Pb	30	33	23	25	12
Th	25	31	23	23	26
U	4.50	6.50	7.00	6.00	6.50
Zr	153	151	196	252	377
Nb	16	11	12	12	17
Y	49	57	46	53	74
La	53	54	45	53	58
Ce	101	99	82	98	110
Nd	46	45	38	49	13
Pr	12	12	9	11	13
Sc	5	6	7	13	13
V	8	2	20	47	15
Cr	2	<2	14	26	10
Co	5	2	8	14	8
Ni	<2	<2	3	8	3
Cu	4	8	14	12	7
Zn	27	36	54	79	42
Sn	7	5	8	4	7
W	5	7	8	5	7
Mo	4	<3	<3	3	3
Ga	15	14	16	17	19
As	2.00	.50	1.00	<.50	<.50
S	<11	<100	<100	700	100
Be	5	4	4	4	4
Bi	<1	<1	1	1	1
Cs	7	<3	<3	3	4
Ge	-	-	-	-	-

Sample number	85094235B	85094235C	85094236	85094240	85094241A
Stratigraphic group	Hatches Creek Group	Hatches Creek Group			
Stratigraphic unit	Mount Strzeleck. Volcanics	Mount Strzeleck. Volcanics	Ali Curung Complex	Barrow Creek Granite	Barrow Creek Granite
Map symbol	Phqp	Phqp			
Lithology	meta porphyry	meta prophyry	granite	granite	granite
Map name	Crawford	Crawford	Taylor	Barrow	Barrow
Grid reference	950580	950580	000520	850220	870190
SiO2	70.81	70.93	76.76	73.99	68.17
TiO2	.56	.55	.13	.15	.64
Al2O3	12.87	12.94	12.20	13.94	14.41
Fe2O3	2.58	1.78	.63	.76	1.40
FeO	2.44	3.45	.58	.90	3.57
MnO	.05	.08	.02	.04	.07
MgO	.47	.56	.05	.34	1.14
CaO	2.13	1.80	.79	.68	1.65
Na2O	1.97	2.34	2.16	2.62	2.02
K2O	4.83	4.72	5.78	5.21	4.85
P2O5	.14	.14	.01	.15	.12
LOI	.88	.87	.89	1.11	1.67
Rest	.24	.24	.17	.17	.25
Total	99.97	100.40	100.17	100.06	99.96

Trace elements in parts per million

Ba	805	758	357	139	630
Li	10	14	12	146	192
Rb	189	232	460	507	274
Sr	96	86	34	33	101
Pb	13	11	41	34	30
Th	27	27	60	25	26
U	6.50	6.50	14.00	27.00	5.00
Zr	378	377	117	87	207
Nb	17	17	10	16	13
Y	74	73	46	44	39
La	55	58	54	25	48
Ce	107	112	90	49	87
Nd	55	55	34	23	41
Pr	13	12	10	5	10
Sc	12	12	3	4	11
V	14	15	<2	6	53
Cr	10	10	<2	3	33
Co	-	-	4	4	14
Ni	2	2	<2	<2	10
Cu	15	5	4	3	11
Zn	30	68	29	43	72
Sn	7	8	9	30	7
W	-	-	8	15	6
Mo	7	<3	3	3	<3
Ga	17	17	16	17	17
As	.50	.50	13.00	2.50	<.50
S	<100	<100	<100	<100	<100
Be	4	4	7	7	4
Bi	<1	<1	2	5	<1
Cs	4	3	10	51	32
Ge	-	-	-	-	-

Sample number	85094241B	85094242	85094246	85094251	85094253
Stratigraphic unit	Barrow Creek Granite	Barrow Creek Granite	Barrow Creek Granite	Jinka Granite	Bonya Metamorph.
Lithology	granite	granite	granite	granite	meta sediment
Map name	Barrow	Barrow	Home of Bullion	Jinka	Jinka
Grid reference	870190	820190	180740	863884	989973
SiO2	71.81	72.84	74.18	69.07	56.28
TiO2	.28	.16	.11	.51	.99
Al2O3	14.00	14.33	13.91	14.09	18.79
Fe2O3	1.16	.83	.78	1.91	7.78
FeO	1.51	.88	.48	2.11	2.44
MnO	.04	.03	.05	.03	.05
MgO	.55	.29	.24	.78	3.01
CaO	1.00	.74	.75	1.40	.56
Na2O	2.39	2.50	2.66	2.40	.68
K2O	5.75	5.45	5.36	5.40	5.85
P2O5	.11	.17	.12	.21	.12
LOI	1.22	1.03	1.11	1.49	3.90
Rest	.27	.18	.16	.31	.25
Total	100.09	99.43	99.91	99.71	100.70

Trace elements in parts per million

Ba	359	214	134	606	705
Li	177	152	139	32	49
Rb	468	483	427	449	327
Sr	63	48	36	83	97
Pb	47	37	47	24	20
Th	102	20	19	95	16
U	21.00	26.00	38.00	14.00	3.00
Zr	240	92	78	439	166
Nb	21	16	16	32	13
Y	74	36	71	82	30
La	100	26	25	147	35
Ce	183	51	44	277	67
Nd	80	24	22	125	30
Pr	21	5	5	34	7
Sc	5	5	4	8	17
V	15	7	5	27	97
Cr	7	2	2	4	115
Co	7	5	4	11	33
Ni	2	<2	<2	2	67
Cu	8	5	14	31	5
Zn	47	40	34	18	71
Sn	17	23	13	9	4
W	9	13	18	7	<2
Mo	<3	<3	<3	3	<3
Ga	19	17	15	20	26
As	.50	<.50	2.00	<.50	<.50
S	<100	<100	<100	<100	<100
Be	6	5	9	5	3
Bi	1	4	6	<1	1
Cs	28	49	39	5	5
Ge	-	-	-	-	-

Sample number	85094254	85094256	85094257A	85094257B
Stratigraphic unit	Bonya Metamorph.	Mascotte Gneiss		
Lithology	meta sediment	quartzofe. gneiss	amphiboli.	amphiboli.
Map name	Jinka	Jinka	Jinka	Jinka
Grid reference	008927	008853	013833	013833
SiO2	58.27	75.11	49.43	46.13
TiO2	.78	.30	.72	.55
Al2O3	20.27	11.78	18.89	18.99
Fe2O3	5.04	1.74	2.38	1.89
FeO	4.02	1.12	6.25	7.42
MnO	.08	.02	.14	.15
MgO	2.60	.35	5.02	8.57
CaO	.50	.43	10.84	9.82
Na2O	.89	2.17	2.00	1.11
K2O	4.34	5.80	1.77	2.29
P2O5	.11	.02	.09	.06
LOI	3.11	.95	2.87	3.28
Rest	.24	.25	.19	.24
Total	100.25	100.04	100.59	100.50
O=F,S,Cl	.00	.00	.00	.03
Total	100.25	100.04	100.59	100.47

Trace elements in parts per million

Ba	656	777	204	145
Li	40	7	27	29
Rb	233	222	121	113
Sr	56	38	112	137
Pb	19	11	12	4
Th	21	56	5	<1
U	4.00	8.00	2.00	1.00
Zr	160	445	91	43
Nb	14	21	4	2
Y	38	117	28	15
La	47	64	11	5
Ce	82	126	25	12
Nd	40	72	15	8
Pr	10	15	3	<3
Sc	20	9	35	28
V	102	<2	156	143
Cr	94	<2	259	273
Co	30	7	40	58
Ni	42	<2	63	198
Cu	67	9	52	58
Zn	107	13	64	68
Sn	7	2	<2	<2
W	4	10	2	<2
Mo	<3	5	4	4
Ga	28	18	16	14
As	<.50	<.50	<.50	<.50
S	<100	<100	100	600
Be	4	3	1	<1
Bi	1	<1	<1	<1
Cs	5	<3	3	3
Ge	-	-	-	-

Sample number	85094258	85094260A	85094260B	85094261	85094263A
Locality	White Violet				
Stratigraphic unit	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.
Lithology	quartzofe. gneiss	quartzofe. gneiss	quartzofe. gneiss	amphiboli.	amphiboli.
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	094856	184894	184894	100895	116859
SiO2	71.58	74.63	74.53	51.73	50.35
TiO2	.48	.18	.18	1.62	1.17
Al2O3	11.65	12.25	12.19	16.24	14.71
Fe2O3	1.78	1.43	1.38	3.31	3.35
FeO	2.42	.90	.95	8.42	10.31
MnO	.03	.06	.06	.16	.20
MgO	.46	.09	.14	3.76	5.68
CaO	1.44	1.61	1.69	8.61	10.67
Na2O	.33	1.57	1.10	2.32	1.64
K2O	7.63	5.75	6.17	1.60	.44
P2O5	.09	.01	.01	.17	.16
LOI	1.74	1.65	1.45	2.12	1.73
Rest	.32	.32	.35	.22	.24
Total	99.95	100.45	100.20	100.28	100.65
O=F,S,Cl	.00	.00	.00	.00	.01
Total	99.95	100.45	100.20	100.28	100.64

Trace elements in parts per million

Ba	1672	1452	1774	228	340
Li	9	35	37	22	5
Rb	273	262	278	134	16
Sr	45	112	103	144	148
Pb	6	11	12	4	14
Th	25	30	31	8	2
U	5.50	5.50	5.00	2.50	<.50
Zr	369	251	248	198	146
Nb	17	19	20	10	7
Y	6	109	12	38	14
La	36	102	99	29	19
Ce	72	180	173	59	44
Nd	39	88	81	30	22
Pr	8	22	23	5	4
Sc	12	5	4	30	40
V	11	<2	2	285	312
Cr	4	<2	<2	41	56
Co	12	5	6	38	56
Ni	<2	<2	<2	48	75
Cu	31	6	3	141	121
Zn	12	21	18	48	205
Sn	7	8	7	2	<2
W	6	11	12	2	<2
Mo	3	<3	<3	6	8
Ga	16	18	16	20	18
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	100	200
Be	2	4	4	2	<1
Bi	1	1	1	1	<1
Cs	<3	<3	<3	18	<3
Ge	-	-	-	-	-

Sample number	85094263B	85094264	85094266A	85094266D	85094267A
Stratigraphic unit	Bonya Metamorph.	Bonya Metamorph.	Jervois Granite	Jervois Granite	Bonya Metamorph.
Lithology	amphiboli.	quartzofe. gneiss	tonalite xenolith	tonalite xenolith	quartzofe. gneiss
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	118859	177819	264856	264856	343001
SiO2	52.41	76.14	64.48	64.13	77.12
TiO2	1.14	.14	.63	.84	.12
Al2O3	15.74	11.35	15.68	15.41	12.35
Fe2O3	2.95	1.22	1.93	1.94	1.14
FeO	8.46	.73	4.31	4.86	.60
MnO	.27	.07	.12	.13	.02
MgO	4.22	.15	2.08	1.79	.05
CaO	10.56	2.51	3.02	3.21	1.42
Na2O	2.28	2.67	2.97	3.18	3.21
K2O	.69	2.88	2.87	2.75	3.56
P2O5	.18	<.01	.15	.24	<.01
LOI	1.61	1.86	1.67	1.51	.50
Rest	.22	.29	.21	.22	.21
Total	100.73	100.01	100.12	100.21	100.30
O=F,S,Cl	.00	.00	.00	.00	.00
Total	100.73	100.01	100.12	100.21	100.30

Trace elements in parts per million

Ba	318	1263	316	382	897
Li	14	15	86	71	13
Rb	32	145	244	228	115
Sr	186	112	111	111	79
Pb	3	67	16	15	14
Th	5	26	11	13	33
U	.50	3.00	5.00	2.50	7.00
Zr	178	212	168	236	185
Nb	9	18	11	14	13
Y	32	94	46	55	101
La	35	79	33	37	53
Ce	62	145	50	70	104
Nd	29	69	26	35	53
Pr	6	17	4	7	13
Sc	34	4	15	16	5
V	244	<2	71	78	2
Cr	67	<2	59	8	<2
Co	43	4	18	18	7
Ni	52	<2	24	10	<2
Cu	109	38	102	110	12
Zn	146	129	99	99	28
Sn	<2	7	5	6	3
W	<2	8	4	4	8
Mo	7	3	<3	3	<3
Ga	18	17	19	20	17
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	100	100	<100
Be	3	5	5	4	5
Bi	<1	1	1	<1	<1
Cs	<3	8	21	15	<3
Ge	-	-	-	-	-

Sample number	85094267B	85094268	85094269A	85094269B	85094270A
Stratigraphic unit	Bonya Metamorph.	Attutra Metagabbro	Attutra Metagabbro	Attutra Metagabbro	Attutra Metagabbro
Lithology	amphiboli.	amphiboli.	amphiboli.	amphiboli.	amphiboli.
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois range
Grid reference	339004	362008	365011	365011	356995
SiO2	50.57	49.71	49.88	48.76	50.51
TiO2	1.65	1.37	.44	.38	.42
Al2O3	14.73	14.29	14.78	19.67	19.66
Fe2O3	2.06	4.57	1.73	1.76	1.69
FeO	7.31	8.86	6.90	5.33	6.10
MnO	.20	.26	.18	.14	.15
MgO	7.52	6.52	9.30	7.12	5.60
CaO	11.29	10.45	13.15	13.53	11.85
Na2O	1.90	1.25	.94	1.19	2.09
K2O	.78	.92	.51	.64	.63
P2O5	.34	.12	<.01	<.01	.02
LOI	1.88	1.95	2.42	2.08	1.80
Rest	.25	.30	.19	.18	.15
Total	100.48	100.57	100.42	100.78	100.67
O=F,S,Cl	.00	.04	.00	.00	.00
Total	100.48	100.53	100.42	100.78	100.66

Trace elements in parts per million

Ba	85	110	71	73	159
Li	28	33	43	46	34
Rb	27	34	34	54	34
Sr	196	102	112	127	142
Pb	4	7	3	6	5
Th	5	1	<1	<1	1
U	3.50	<.50	<.50	<.50	1.50
Zr	234	88	16	23	28
Nb	10	2	<2	2	<2
Y	45	42	15	12	14
La	27	7	2	4	4
Ce	57	21	6	9	9
Nd	32	14	5	4	5
Pr	5	<3	<3	<3	<3
Sc	36	52	57	40	41
V	218	334	257	179	179
Cr	501	271	458	437	86
Co	34	50	48	41	37
Ni	122	49	81	77	64
Cu	3	206	42	15	50
Zn	78	118	60	72	59
Sn	42	<2	2	<2	<2
W	<2	<2	<2	2	<2
Mo	7	3	<3	6	4
Ga	17	17	14	16	18
As	<.50	<.50	<.50	<.50	<.50
S	<100	800	<100	<100	100
Be	2	2	1	2	2
Bi	<1	<1	<1	1	<1
Cs	6	7	7	23	10
Ge	-	-	-	-	-

Sample number	85094270B	85094271A	85094272	85094274	85094276
Locality				Casey Inlier	
Stratigraphic unit	Attutra Metagabbro	Jervois Granite	Jervois Granite	Casey Bore Granite	Casey Bore Granite
Lithology	amphiboli.	granite	granite	granite	granite
Map name	Jervois Range	Jervois Range	Jervois Range	Todd	Todd
Grid reference	356995	503873	488880	280410	340360
SiO2	49.80	69.70	71.43	69.32	68.48
TiO2	.55	.46	.46	.42	.50
Al2O3	20.28	14.21	13.54	14.44	14.47
Fe2O3	1.92	1.27	1.19	1.71	1.97
FeO	5.90	1.38	1.38	1.54	1.43
MnO	.14	.04	.04	.06	.07
MgO	5.31	.55	.64	1.12	1.11
CaO	11.73	1.57	1.29	2.48	2.40
Na2O	2.15	2.78	2.62	2.94	2.74
K2O	.71	5.82	5.67	4.22	4.67
P2O5	.02	.09	.09	.09	.13
LOI	1.88	1.09	1.31	1.34	1.41
Rest	.16	.31	.30	.21	.26
Total	100.55	99.27	99.96	99.89	99.64
O=F,S,Cl	.00	.00	.00	.00	.00
Total	100.55	99.27	99.96	99.89	99.63

Trace elements in parts per million

Ba	352	1313	1190	737	921
Li	36	30	19	24	24
Rb	38	199	199	190	217
Sr	148	144	131	215	228
Pb	6	21	29	23	24
Th	<1	17	22	24	29
U	<.50	3.00	3.50	2.50	5.00
Zr	28	394	362	156	223
Nb	<2	11	12	11	12
Y	14	28	28	30	34
La	3	90	107	45	55
Ce	9	153	188	84	97
Nd	4	59	70	37	38
Pr	<3	17	18	8	8
Sc	37	6	6	8	10
V	223	17	17	45	45
Cr	65	3	3	12	2
Co	38	6	6	9	9
Ni	67	2	2	5	<2
Cu	49	8	6	2	4
Zn	61	44	42	46	53
Sn	2	<2	2	3	3
W	2	3	4	4	4
Mo	3	4	6	3	<3
Ga	18	16	15	17	16
As	<.50	<.50	<.50	<.50	<.50
S	<100	<100	<100	<100	100
Be	2	3	3	4	4
Bi	1	1	<1	1	1
Cs	14	<3	<3	<3	<3
Ge	-	-	-	-	-

Sample number	85094278	85094279	85094281	85094282	85094284
Stratigraphic unit	Atneequa Granite		Atneequa Granite	Atneequa Granite	Atneequa Granite
Lithology	granite	diorite fine, meta	granite	granite	granite
Map name	Limbla	Limbla	Limbla	Limbla	Limbla
Grid reference	405725	223801	401772	218889	144943
SiO2	65.08	52.20	73.15	68.88	63.64
TiO2	.95	.82	.36	.44	.69
Al2O3	14.58	15.65	13.05	14.50	15.68
Fe2O3	2.99	2.18	1.29	2.29	3.38
FeO	1.96	6.78	.67	1.42	2.45
MnO	.12	.22	.04	.08	.23
MgO	1.42	6.21	.34	1.16	1.77
CaO	2.36	8.33	1.08	3.04	3.26
Na2O	2.58	2.28	1.92	2.56	2.33
K2O	5.47	1.85	6.51	4.25	3.91
P2O5	.35	.10	.08	.14	.37
LOI	1.70	3.37	1.11	.99	1.89
Rest	.38	.26	.30	.25	.29
Total	99.94	100.25	99.90	100.00	99.89
O=F,S,Cl	.00	.00	.00	.00	.00
Total	99.94	100.24	99.90	100.00	99.89

Trace elements in parts per million

Ba	1536	373	1339	1032	1018
Li	33	36	24	24	58
Rb	206	127	191	152	220
Sr	303	136	148	300	277
Pb	25	122	29	22	27
Th	23	7	18	15	4
U	4.00	1.50	2.00	2.50	3.50
Zr	412	107	338	162	274
Nb	22	5	6	11	14
Y	46	26	9	32	41
La	106	20	100	50	24
Ce	192	34	181	91	53
Nd	84	19	67	41	29
Pr	20	<3	19	9	3
Sc	12	36	4	11	13
V	47	193	15	51	71
Cr	2	330	<2	6	14
Co	10	35	5	10	13
Ni	<2	4	<2	5	6
Cu	7	15	6	7	57
Zn	82	230	30	52	80
Sn	2	<2	<2	3	2
W	4	<2	3	5	5
Mo	4	5	7	3	4
Ga	17	18	11	16	18
As	.50	3.50	<.50	1.00	3.00
S	<100	100	<100	<100	<100
Be	5	2	2	3	3
Bi	1	<1	<1	<1	1
Cs	<3	<3	<3	6	11
Ge	-	-	-	-	-

Sample number	85094287	85902013	85904249
Locality	Railway Quarry		
Stratigraphic group		Strangways Metamorph. Complex	
Stratigraphic unit		Bleechmore Granulite	
Map symbol		pCs	
Lithology	granite	garnet-bearing quartzofe.	tonalite granite
Map name	Taylor	Alcoota	Woolla
Grid reference	270370	260560	760430
Drill hole	DD5		
Depth	278m		
SiO2	72.72	72.79	64.74
TiO2	.30	.23	1.10
Al2O3	12.93	14.36	13.68
Fe2O3	1.93	.79	2.99
FeO	1.01	1.46	4.57
MnO	.05	.04	.11
MgO	.35	.66	1.46
CaO	1.23	2.08	3.69
Na2O	2.57	2.71	2.17
K2O	5.05	4.19	3.67
P2O5	.06	.05	.26
LOI	1.29	.58	1.40
Rest	.23	.17	.23
Total	99.72	100.11	100.07

Trace elements in parts per million

Ba	923	706	654
Li	13	11	55
Rb	253	161	161
Sr	69	139	106
Pb	7	35	21
Th	25	16	15
U	5.50	1.50	4.00
Zr	275	113	301
Nb	15	7	15
Y	52	21	56
La	54	30	41
Ce	100	55	79
Nd	45	24	40
Pr	10	6	9
Sc	8	6	16
V	7	23	72
Cr	4	17	20
Co	6	7	19
Ni	<2	13	8
Cu	9	8	22
Zn	38	43	90
Sn	7	2	4
W	8	2	5
Mo	<3	<3	<3
Ga	16	16	18
As	4.50	<.50	3.00
S	<100	<100	<100
Be	4	2	2
Bi	<1	<1	1
Cs	<3	<3	9

Sample number	72902005	72902006	72902009	73902012
Stratigraphic group			Strangways Metamorph. Complex	Strangways Metamorph. Complex
Stratigraphic unit	Mount Ida Granite		Kanandra Granulite	Bleechmore Granulite
Map symbol			pCsk	pCs
Lithology	granite	granite (pegmatoi.	garnet quartzofe. gneiss	garnet quartzofe. gneiss
Map name	Utopia	Utopia	Delny	Alcoota
Grid reference	661170	680170	910855	390760
SiO2	74.26	76.67	75.56	70.99
TiO2	.15	.01	.06	.46
Al2O3	12.95	13.29	12.51	13.83
Fe2O3	.81	.24	.43	1.24
FeO	.96	.14	1.78	3.62
MnO	.01	.03	.07	.09
MgO	.23	.07	.51	1.12
CaO	1.03	.37	1.80	2.23
Na2O	2.26	2.59	2.08	1.90
K2O	6.24	5.66	3.98	4.03
P2O5	.05	.07	.03	.04
LOI	.81	.64	.68	.51
Rest	.17	.14	.16	.28
Total	99.93	99.92	99.65	100.34
O=F,S,Cl	.00	.02	.00	.00
Total	99.93	99.90	99.65	100.34

Trace elements in parts per million

Ba	222	16	649	1461
Li	28	32	5	7
Rb	374	569	117	152
Sr	48	8	120	160
Pb	65	33	33	23
Th	82	6	7	14
U	49.00	2.00	1.00	.50
Zr	149	27	203	272
Nb	13	25	2	7
Y	81	28	46	30
La	62	3	26	28
Ce	121	9	43	50
Nd	38	<3	13	15
Sc	3	3	11	11
V	3	<2	8	45
Cr	<2	4	10	28
Co		7	8	14
Ni	<2	5	5	12
Cu	2	<2	<2	14
Zn	41	5	12	46
Sn	2	35	<2	<2
W	5	14	4	3
Mo	<3	3	<3	4
Ga	14	21	11	14
As	.50	.50	<.50	<.50
F	<200	400	-	-
Be	2	2	<1	<1
Bi	<2	<2	<2	<2

Sample number	86094343	86094344	86094352	86924351	86924353
Stratigraphic unit	Jervois Granite ?	Jervois Granite ?			
Lithology	granite (fine grained)	granite (fine grained)	granite	granite	granite
Map name	Jervois Range	Jervois Range	Hermannsb.	Napperby	Napperby
Grid reference	350010	350005			
Drill hole			BMR Herma2	BMR Nappe8	BMR Nappe9
Depth			86.40-86.7	141.80-140	149.00-156
SiO2	72.90	71.02	71.41	72.18	72.25
TiO2	.17	.29	.30	.20	.20
Al2O3	14.53	14.91	14.13	14.01	14.88
Fe2O3	.91	.97	1.01	.89	.31
FeO	.73	1.58	1.17	1.25	1.22
MnO	.03	.04	.03	.02	.03
MgO	.46	.79	.63	.66	.44
CaO	2.07	2.45	1.71	.32	1.08
Na2O	3.89	3.68	2.57	2.37	2.34
K2O	3.03	2.95	5.88	6.49	6.11
P2O5	.04	.08	.08	.11	.24
LOI	.94	1.08	.97	1.29	.93
Rest	.19	.23	.33	.32	.18
Total	99.89	100.07	100.22	100.11	100.21
O=F,S,Cl	.01	.01	.02	.05	.02
Total	99.88	100.05	100.19	100.06	100.19

Trace elements in parts per million

Ba	745	734	889	310	302
Li	18	30	13	11	30
Rb	109	139	306	552	281
Sr	162	200	158	49	70
Pb	35	2	39	46	56
Th	26	22	83	71	23
U	11.00	7.00	11.00	50.00	30.00
Zr	134	192	228	146	104
Nb	4	6	11	22	9
Y	14	15	24	71	19
La	27	34	110	55	28
Ce	45	62	198	112	56
Nd	16	23	70	46	24
Pr	4	7	21	12	6
Sc	4	5	5	5	3
V	10	22	23	9	4
Cr	3	8	7	3	2
Co	5	6	5	4	3
Ni	2	3	4	1	2
Cu	3	<1	7	<1	<1
Zn	23	52	43	12	48
Sn	3	3	4	19	6
W	2	<2	2	5	2
Mo	<2	<2	<2	2	2
Ga	20	21	18	20	20
As	.50	.50	.50	1.00	1.00
S	30.00	25.00	86.00	23.00	13.00
F	100	200	400	1100	300
Cl	95	82	75	99	92
Be	2	1	2	3	3
Bi	<1	<1	<1	1	1
Hf	4	6	5	4	4
Ta	<2	2	<2	<2	<2
Cs	5	7	5	6	7

APPENDIX 2

Analyses of specimens collected from the Huckitta 1:250 000 Sheet area, 1980

Sample number	80091450	80091451	80091452	80091453	80091454
Stratigraphic unit	Bonya Metamorph.		Jervois Granite ?	Jervois Granite ?	Xanten Granite
Lithology	meta volcanic (quartzof.	granite	granite	granite	leuco granite
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	183892		144940	148934	221864
SiO2	75.56	71.22	72.91	57.12	78.31
TiO2	.12	.41	.09	.92	.15
Al2O3	11.77	13.35	14.39	17.75	12.49
Fe2O3	.90	1.41	.61	3.56	<.01
FeO	.78	2.98	.52	3.44	.17
MnO	.02	.10	.05	.09	<.01
MgO	.45	.71	.56	2.66	.35
CaO	1.07	2.13	.75	5.32	3.34
Na2O	2.51	2.19	3.02	3.20	3.50
K2O	5.97	4.49	5.49	2.12	.32
P2O5	.01	.10	.28	.26	<.01
H2O+	.47	.68	.70	2.24	.31
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.51	<.10	<.10	.54	.30
LOI	-	-	-	-	.52
Rest	.44	.30	.18	.26	.07
Total	100.58	100.07	99.55	99.48	99.83
O=F,S,Cl	.07	.03	.02	.02	.00
Total	100.51	100.05	99.53	99.46	99.83

Trace elements in parts per million

Ba	1161	794	143	311	52
Li	10	27	82	45	13
Rb	239	189	470	125	6
Sr	133	93	41	296	149
Pb	13	13	54	10	9
Th	33	28	14	7	61
U	4	2	8	4	3
Zr	209	314	78	422	111
Nb	20	14	18	7	15
Y	98	90	15	16	56
La	92	91	13	18	4
Ce	172	169	37	39	14
Nd	61	62	11	17	11
Sc	2	9	2	11	<2
V	3	6	5	95	2
Cr	<2	<2	5	45	3
Ni	4	3	2	19	2
Cu	6	4	39	23	4
Zn	20	101	40	79	9
Sn	5	<2	3	2	4
W	-	-	-	-	-
Mo	<3	<3	<3	<3	<3
Ga	14	16	12	22	15
As	<1.00	<1.00	<1.00	1.00	<1.00
F	1700	500	500	<200	
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80091455	80091456	80091457	80091458
Stratigraphic unit		Attutra Metagabbro	Unca Granite	Attutra Metagabbro
Lithology		amphiboli.	granite alaskite	amphiboli.
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference		364004	329989	364004
SiO2	59.13	49.33	76.72	46.39
TiO2	.81	.48	.08	1.21
Al2O3	18.16	20.95	11.89	15.59
Fe2O3	6.98	1.24	.87	3.05
FeO	1.50	5.99	.58	9.17
MnO	.09	.15	.02	.22
MgO	3.08	5.23	.41	8.05
CaO	.64	11.63	.52	13.45
Na2O	1.15	1.69	2.98	1.29
K2O	3.72	1.03	4.92	.18
P2O5	.13	.06	.01	.02
H2O+	3.29	1.80	.42	.80
H2O-	.25	<.10	<.10	<.10
CO2	.30	.19	.20	.30
LOI	-	-	-	1.33
Rest	.25	.12	.30	.18
Total	99.48	99.89	99.92	101.23
O=F,S,Cl	.00	.00	.06	.00
Total	99.48	99.89	99.86	101.23

Trace elements in parts per million

Ba	778	137	494	29
Li	128	47	21	7
Rb	254	75	292	10
Sr	85	160	26	142
Pb	21	5	16	<2
Th	16	<2	28	<2
U	1	<1	2	<1
Zr	152	32	135	6
Nb	11	<2	20	<2
Y	21	12	103	10
La	24	<2	42	<2
Ce	56	10	91	<3
Nd	21	5	39	<3
Sc	19	27	<2	47
V	89	146	2	403
Cr	85	69	<2	361
Ni	44	47	2	50
Cu	3	25	3	21
Zn	90	70	35	76
Sn	3	<2	3	<2
W	-	-	-	-
Mo	<3	3	<3	5
Ga	23	18	21	17
As	1.00	<1.00	<1.00	2.00
F	-	-	1400	-
Be	-	-	-	-
Bi	-	-	-	-

Sample number	80091459B	80091459C	80093519	80093520	80093521
Stratigraphic unit	Attutra Metagabbro	Attutra Metagabbro	Jinka Granite	Jinka Granite	Jinka Granite
Lithology	amphiboli.	amphiboli.	granite	granite	granite
Map name	Jervois Range	Jervois Range	Jinka	Jinka	Jinka
Grid reference	409981	409981	816934	817938	821939
SiO2	47.94	47.80	70.23	67.75	67.82
TiO2	.27	.31	.38	.60	.59
Al2O3	23.55	25.38	13.63	14.19	14.00
Fe2O3	1.18	1.01	1.32	1.60	1.56
FeO	4.02	2.77	1.78	2.76	2.82
MnO	.13	.09	.03	.04	.04
MgO	4.22	2.93	.97	1.17	1.09
CaO	13.02	12.21	1.20	1.57	1.73
Na2O	2.02	2.13	2.19	1.90	1.92
K2O	.91	1.70	6.05	5.67	5.91
P2O5	.03	.03	.15	.24	.25
H2O+	1.96	2.80	.98	1.14	1.31
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.42	.14	.26	.22	.35
LOI	-	-	-	-	-
Rest	.09	.10	.42	.63	.58
Total	99.76	99.40	99.59	99.48	99.97
O=F,S,Cl	.00	.00	.08	.15	.13
Total	99.76	99.40	99.50	99.33	99.85

Trace elements in parts per million

Ba	70	142	323	592	605
Li	29	42	23	15	18
Rb	55	116	472	433	418
Sr	198	242	65	91	89
Pb	5	6	28	22	15
Th	<2	<2	87	78	92
U	<1	1	14	6	8
Zr	6	8	261	469	479
Nb	<2	<2	22	25	26
Y	6	4	66	62	53
La	<2	<2	98	112	130
Ce	<3	3	197	224	255
Nd	<3	<3	62	72	84
Sc	26	16	7	6	7
V	111	80	18	33	31
Cr	65	9	4	4	<2
Ni	31	22	4	4	4
Cu	11	9	11	12	16
Zn	50	42	15	25	18
Sn	<2	2	11	7	5
W	-	-	-	-	-
Mo	3	<3	<3	-	<3
Ga	19	19	14	19	16
As	<1.00	<1.00	<1.00	<1.00	1.00
F	-	-	2000	3500	3000
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80093533A	80093533C	80093534	80093540A	80093540B
Stratigraphic unit	Bonya Metamorph.	Bonya Metamorph.	Jervois Granite	Jervois Granite	Jervois Granite
Lithology	amphiboli.	calc silicate rock	granite	granite granodior.	granite
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	082904	082904	254857	503873	503873
SiO2	52.72	70.35	65.33	64.56	72.52
TiO2	1.25	.43	.57	.86	.29
Al2O3	14.74	14.58	15.21	14.33	13.19
Fe2O3	2.07	.66	1.40	1.65	.66
FeO	9.37	1.92	3.81	4.19	1.34
MnO	.21	.06	.10	.08	.03
MgO	5.01	1.21	1.56	1.77	.79
CaO	9.70	3.64	2.89	3.64	1.36
Na2O	2.35	4.75	3.26	2.55	2.51
K2O	.27	.67	3.24	3.56	5.24
P2O5	.22	.16	.21	.34	.09
H2O+	1.14	.74	1.34	1.28	.68
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.10	.11	.46	.27	.17
LOI	-	-	-	-	-
Rest	.16	.13	.32	.25	.28
Total	99.31	99.41	99.70	99.33	99.15
O=F,S,Cl	.00	.00	.05	.00	.04
Total	99.31	99.41	99.66	99.33	99.11

Trace elements in parts per million

Ba	126	105	589	667	555
Li	2	10	38	32	22
Rb	4	39	188	173	255
Sr	197	148	123	167	100
Pb	2	5	18	11	19
Th	7	22	28	40	48
U	<1	2	3	6	7
Zr	183	322	294	389	200
Nb	8	8	12	20	15
Y	32	23	64	32	23
La	30	69	64	100	100
Ce	65	100	124	185	192
Nd	22	39	44	56	14
Sc	30	5	11	8	3
V	243	33	31	64	14
Cr	73	6	9	14	<2
Ni	47	4	8	9	2
Cu	43	13	13	15	5
Zn	46	20	72	62	31
Sn	<2	<2	3	5	3
W	-	-	-	-	-
Mo	4	<3	<3	<3	<3
Ga	18	16	19	18	15
As	5.00	2.00	1.00	<1.00	<1.00
F	-	-	1100	-	900
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80093541	80096105	80096112D	80096163	80096179
Stratigraphic group		Strangways Metamorph. Complex	Strangways Metamorph. Complex		Strangways Metamorph. Complex
Stratigraphic unit	Jervois Granite	Kanandra Granulite	Kanandra Granulite	Pgg?	Kanandra Granulite
Map symbol					pCsk
Lithology	granite	mafic granulite	mafic granulite	granite	mafic granulite
Map name	Jervois Range	Dneiper	Dneiper	Dneiper	Dneiper
Grid reference	494873	004913	061838	417863	405874
SiO2	72.35	49.01	48.07	64.15	51.89
TiO2	.40	.70	1.52	.75	1.33
Al2O3	13.03	27.04	13.60	15.51	13.78
Fe2O3	.95	1.32	5.07	2.00	4.27
FeO	1.54	3.44	8.72	4.02	8.12
MnO	.06	.06	.24	.09	.19
MgO	.81	2.11	7.41	2.15	6.56
CaO	1.41	12.91	12.11	3.88	8.84
Na2O	2.31	2.43	2.40	2.78	2.87
K2O	5.48	.36	.36	2.81	.59
P2O5	.10	.18	.19	.20	.17
H2O+	.71	<.10	.44	.35	.35
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	<.10	.14	.16	.26	.33
LOI	-	-	-	-	-
Rest	.35	.09	.17	.33	.21
Total	99.50	99.79	100.46	99.28	99.50
O=F,S,Cl	.04	.00	.00	.04	.00
Total	99.46	99.79	100.46	99.25	99.50

Trace elements in parts per million

Ba	1016	129	87	869	477
Li	29	8	7	20	12
Rb	207	2	2	149	18
Sr	129	379	119	227	250
Pb	17	5	3	20	6
Th	14	<2	<2	14	<1
U	4	<1	<1	<1	<1
Zr	318	23	105	225	92
Nb	9	<2	3	12	2
Y	28	10	34	22	18
La	106	8	9	75	26
Ce	176	19	22	128	43
Nd	55	6	7	37	14
Sc	3	10	38	13	18
V	15	68	312	56	167
Cr	<2	18	176	40	227
Ni	5	6	63	19	87
Cu	4	5	49	5	47
Zn	45	30	94	79	93
Sn	2	<2	2	4	<2
W	-	-	-	-	-
Mo	<3	<3	4	<3	3
Ga	13	23	17	19	17
As	<1.00	<1.00	<1.00	<1.00	1.00
F	900	-	-	900	-
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096234	80096238A	80096243	80096260A	80096285A
Stratigraphic unit	Dneiper Granite	Cackleber. Metamorph.		Cackleber. Metamorph.	Pd
Map symbol			Pga		
Lithology	granite	calc silicate rock	granite	cordierite anthophyl. rock	Metanorite
Map name	Dneiper	Dneiper	Dneiper	Dneiper	Jinka
Grid reference	464890	458904	455876	466908	593877
SiO2	64.96	53.20	71.95	59.95	51.29
TiO2	1.10	1.08	.48	1.10	1.32
Al2O3	13.61	14.72	12.86	13.23	14.90
Fe2O3	3.77	4.60	1.17	1.34	1.76
FeO	4.24	7.08	2.15	9.42	8.84
MnO	.11	.16	.06	.09	.17
MgO	2.00	5.66	.89	9.87	6.73
CaO	3.31	8.27	2.00	.29	9.07
Na2O	2.64	2.56	2.46	.65	2.51
K2O	2.58	.39	4.81	.63	1.05
P2O5	.27	.13	.09	.24	.14
H2O+	1.03	1.26	.49	2.05	1.01
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.16	.18	.30	.16	.46
LOI	-	-	-	-	-
Rest	.27	.15	.27	.32	.19
Total	100.05	99.44	99.98	99.34	99.44
O=F,S,Cl	.03	.00	.03	.05	.00
Total	100.01	99.44	99.95	99.29	99.44

Trace elements in parts per million

Ba	478	168	680	27	271
Li	9	4	9	50	4
Rb	180	15	257	40	52
Sr	127	197	79	4	190
Pb	15	6	23	2	6
Th	22	8	27	16	2
U	4	1	3	3	<1
Zr	186	106	250	295	88
Nb	12	4	11	11	5
Y	55	28	46	46	22
La	56	28	40	19	15
Ce	104	41	78	46	23
Nd	37	16	28	14	11
Sc	17	37	4	25	19
V	61	235	19	95	141
Cr	21	54	8	454	263
Ni	10	47	4	124	118
Cu	25	13	7	2	69
Zn	81	64	43	50	93
Sn	7	2	6	5	<2
W	-	-	-	-	-
Mo	-	-	<3	<3	-
Ga	20	15	13	18	17
As	1.00	<1.00	<1.00	1.00	1.00
F	800	-	800	1300	-
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096323	80096342	80096358	80096409	80096446
Locality	Yam Creek				
Stratigraphic unit		Pgr	Pgy	Pgy	Pgy
Lithology	granite	granite	granite	granite	granite
Map name	Dneiper	Dneiper	Dneiper	Dneiper	Dneiper
Grid reference	363911	397927	433950	456937	490970
SiO2	73.36	73.64	67.34	71.14	72.07
TiO2	.35	.28	.73	.50	.45
Al2O3	12.75	12.48	13.71	13.26	13.00
Fe2O3	.56	.74	1.63	.86	1.05
FeO	1.48	1.76	3.22	2.62	2.13
MnO	.03	.05	.07	.07	.06
MgO	.89	1.17	1.45	1.07	.97
CaO	1.24	.66	2.37	1.61	1.60
Na2O	2.09	1.93	2.51	2.90	2.31
K2O	5.77	5.95	4.86	4.47	5.04
P2O5	.08	.04	.15	.11	.11
H2O+	.51	.55	1.29	.54	.51
H2O-	.11	<.10	<.10	<.10	<.10
CO2	.22	.13	.17	.16	.11
LOI	-	-	-	-	-
Rest	.22	.35	.34	.26	.27
Total	99.66	99.73	99.84	99.57	99.68
O=F,S,Cl	.03	.06	.05	.04	.04
Total	99.63	99.67	99.79	99.53	99.64

Trace elements in parts per million

Ba	400	825	748	394	471
Li	15	23	23	21	17
Rb	282	353	293	300	323
Sr	91	72	121	67	76
Pb	31	22	20	25	28
Th	38	25	27	33	35
U	<1	4	4	6	6
Zr	152	201	297	209	173
Nb	6	8	13	12	10
Y	7	21	37	16	28
La	74	44	46	54	52
Ce	134	80	85	102	101
Nd	36	24	27	30	30
Sc	3	4	8	5	5
V	19	9	44	26	23
Cr	9	<2	23	9	8
Ni	6	2	10	6	6
Cu	<2	10	9	4	3
Zn	34	44	55	52	42
Sn	<2	9	5	6	6
W	-	-	-	-	-
Mo	<3	<3	<3	<3	<3
Ga	14	11	16	15	13
As	<1.00	<1.00	<1.00	<1.00	<1.00
F	600	1400	1100	900	1000
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096461	80096483	80096492	80096520	80096539
Stratigraphic unit	Pgy	Pgy	Pgk	Ilappa Dyke Swarm	
Lithology	granite	granite	granite	metadoler.	metanorite
Map name	Dneiper	Dneiper	Dneiper	Dneiper	Dneiper
Grid reference	465003	426013	388026	363003	305970
SiO2	71.84	70.26	70.75	53.19	50.88
TiO2	.43	.45	.37	.95	.23
Al2O3	12.71	13.32	13.68	15.25	14.23
Fe2O3	.71	.66	.79	.65	.96
FeO	2.35	2.70	1.97	9.04	5.26
MnO	.06	.05	.05	.17	.14
MgO	1.02	1.18	.86	6.36	11.67
CaO	1.39	1.84	1.31	7.71	12.02
Na2O	2.27	2.26	2.28	.53	.96
K2O	5.36	5.22	5.86	1.85	1.03
P2O5	.08	.11	.13	.09	.03
H2O+	.87	.92	.85	3.27	1.60
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.25	.22	.13	.19	.48
LOI	-	-	-	-	-
Rest	.27	.28	.37	.16	.28
Total	99.61	99.47	99.40	99.41	99.77
O=F,S,Cl	.04	.04	.06	.00	.00
Total	99.57	99.43	99.34	99.41	99.77

Trace elements in parts per million

Ba	507	533	355	108	92
Li	14	23	24	33	16
Rb	324	318	468	156	63
Sr	77	86	76	128	94
Pb	29	31	49	4	2
Th	38	31	97	6	2
U	12	3	15	<1	<1
Zr	182	162	240	69	28
Nb	9	9	17	4	<2
Y	23	25	39	17	10
La	47	54	102	15	6
Ce	90	99	191	25	11
Nd	29	31	59	10	4
Sc	4	6	4	23	34
V	23	31	20	150	113
Cr	13	16	9	178	1142
Ni	8	8	5	113	219
Cu	4	11	3	31	92
Zn	36	49	35	83	38
Sn	5	7	14	3	<2
W	-	-	-	-	-
Mo	<3	<3	<1	<3	<3
Ga	14	15	17	16	11
As	<1.00	<1.00	<1.00	<1.00	2.00
F	900	1000	1500	-	-
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096543C	80096556	80096559	80096584	80096585
Stratigraphic group				Strangways Metamorph. Complex	
Stratigraphic unit	Dneiper Granite	Dneiper Granite	Mount Swan Granite	Kanandra Granulite	Marshall Granite
Lithology	granite	granite	granite	quartzofe. gneiss	granite
Map name	Dneiper	Dneiper	MacDonald Downs	Jinka	Jinka
Grid reference	276981	068078	090150	576830	598875
SiO2	70.49	68.01	71.32	73.13	73.64
TiO2	.59	.77	.35	.29	.37
Al2O3	13.45	13.23	13.29	13.69	12.34
Fe2O3	1.53	2.27	1.09	1.11	1.63
FeO	2.52	3.12	1.91	.84	1.22
MnO	.06	.09	.04	.02	.02
MgO	1.12	1.48	.91	.89	.64
CaO	2.28	2.47	1.30	2.07	1.15
Na2O	2.18	2.05	2.00	2.93	2.68
K2O	4.11	4.40	6.32	4.26	5.31
P2O5	.14	.18	.12	.06	.06
H2O+	.61	1.27	.55	.25	.42
H2O-	<.10	<.10	<.10	<.10	<.10
CO2	.10	.13	.23	.17	.11
LOI	-	-	-	-	-
Rest	.31	.31	.35	.21	.15
Total	99.49	99.78	99.78	99.92	99.74
O=F,S,Cl	.04	.04	.05	.00	.01
Total	99.45	99.74	99.72	99.92	99.73

Trace elements in parts per million

Ba	705	606	388	711	388
Li	19	21	17	18	3
Rb	233	247	477	225	243
Sr	103	113	71	191	53
Pb	16	22	43	39	6
Th	30	28	97	61	4
U	5	5	25	3	1
Zr	217	265	270	273	254
Nb	10	12	16	4	5
Y	41	45	14	<2	41
La	60	52	95	61	15
Ce	111	98	184	96	26
Nd	35	34	52	24	11
Sc	7	9	5	2	4
V	60	49	12	13	8
Cr	11	19	9	8	5
Ni	6	8	3	3	2
Cu	3	12	3	3	5
Zn	29	71	34	25	12
Sn	6	6	<2	4	<2
W	-	-	-	-	-
Mo	<3	<3	<3	<3	<3
Ga	16	15	15	17	16
As	1.00	1.00	<1.00	<1.00	<1.00
F	1000	1000	1300	-	200
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096586	80096600	80096601	80096602	80096603
Locality		Marshall orebody			
Stratigraphic unit	Marshall Granite	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.
Lithology	granite	schist	schist	schist	schist
Map name	Dneiper	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Grid reference	513900				
Drill hole		UC4	UC4	UC4	UC4
SiO2	70.09	56.86	58.25	48.89	52.77
TiO2	.54	.73	.76	1.11	.52
Al2O3	12.74	16.15	17.25	14.51	12.97
Fe2O3	2.01	5.84	3.38	4.84	14.19
FeO	2.55	3.08	4.88	8.06	4.65
MnO	.05	.16	.22	.43	.64
MgO	.92	2.57	3.24	9.04	2.67
CaO	1.92	2.04	1.33	1.79	6.24
Na2O	2.46	.64	1.00	.16	.40
K2O	5.20	7.85	5.32	5.61	2.08
P2O5	.12	.17	.16	.10	.11
H2O+	.90	2.45	2.90	4.11	1.97
H2O-	.10	<.10	.16	.11	<.10
CO2	.10	1.37	.15	.61	.36
LOI	-	-	-	-	-
Rest	.24	.24	.27	.30	.33
Total	99.94	100.15	99.27	99.67	99.90
O=F,S,Cl	.03	.00	.00	.00	.00
Total	99.91	100.15	99.27	99.67	99.90

Trace elements in parts per million

Ba	488	640	692	292	679
Li	4	76	138	331	76
Rb	263	395	388	603	313
Sr	60	28	56	45	112
Pb	9	7	12	4	25
Th	41	19	21	<2	19
U	4	6	3	1	4
Zr	290	143	189	64	111
Nb	12	11	12	2	7
Y	-	28	19	<2	35
La	46	61	42	6	31
Ce	98	113	93	13	74
Nd	36	41	32	4	24
Sc	8	16	16	23	12
V	14	77	80	201	74
Cr	6	75	79	126	54
Ni	4	40	46	111	29
Cu	7	3	3	3	738
Zn	20	110	171	329	176
Sn	2	3	<2	2	5
W	-	-	-	-	-
Mo	<3	<3	<3	3	4
Ga	16	21	21	17	18
As	<1.00	<1.00	<1.00	<1.00	1.00
F	700	-	-	-	-
Be	-	-	-	-	-
Bi	-	-	-	-	-

Sample number	80096604	80096605	80096606	80096607	80096608
Locality			Marshall lode		
Stratigraphic unit	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.	Bonya Metamorph.
Lithology	schist	schist	Schist	schist	schist
Map name	Jervois Range	Jervois Range	Jervois Range	Jervois Range	Jervois Range
Drill hole	UC4	UC4	UC4	UC4	UC4
SiO2	68.99	62.66	56.08	55.51	62.94
TiO2	.23	.72	.70	.39	.74
Al2O3	10.61	17.90	15.93	9.08	17.12
Fe2O3	6.35	3.36	7.73	16.65	5.16
FeO	5.37	4.77	4.17	8.44	3.10
MnO	.42	.40	.36	3.71	1.37
MgO	1.64	3.16	3.51	1.41	.92
CaO	.29	.31	.87	.76	.30
Na2O	.37	.22	.52	.15	.35
K2O	3.17	3.64	4.98	2.03	4.87
P2O5	.06	.19	.21	.39	.18
H2O+	1.80	2.56	3.48	.92	2.05
H2O-	<.10	<.10	-	<.10	<.10
CO2	.22	.16	.69	.20	.24
LOI	-	-	4.00	-	-
Rest	.22	.28	.25	.21	.34
Total	99.74	100.33	103.48	99.85	99.68

Trace elements in parts per million

Ba	781	942	513	767	1220
Li	107	166	141	92	179
Rb	258	251	383	216	613
Sr	15	16	33	13	29
Pb	9	22	19	22	38
Th	23	22	16	7	17
U	2	3	4	1	5
Zr	166	169	138	84	173
Nb	7	12	11	7	19
Y	35	26	18	16	10
La	27	30	40	43	33
Ce	64	71	92	90	75
Nd	20	25	29	28	28
Sc	<2	12	14	<2	12
V	27	75	74	55	82
Cr	6	62	65	39	83
Ni	5	34	37	20	19
Cu	13	20	2	5	7
Zn	176	190	343	203	52
Sn	2	5	3	<2	4
W	-	-	-	-	-
Mo	<3	<3	<3	5	<3
Ga	15	21	20	11	25
As	1.00	1.00	1.00	4.00	1.00
F	-	-	-	-	-
Be	-	-	-	-	-
Bi	-	-	-	-	-

Ruby mine

Sample number	79091888A	79091888B	79091889	79096004
Locality		Ruby Mine	Ruby Mine	Ruby Mine
Stratigraphic group	Harts Range			Harts Range
Stratigraphic unit	Riddock Amphiboli.	Riddock Amphiboli.	Riddock Amphiboli.	Riddock Amphiboli.
Lithology	amphiboli.	amphiboli.	amphiboli.	amphiboli.
Map name	Quartz	Quartz	Quartz	Quartz
Grid reference				046467
Bibliographic ref.	Shaw	Shaw	Shaw	McColl
SiO2	42.33	44.62	42.00	61.50
TiO2	.03	.10	.10	.01
Al2O3	32.23	22.14	20.07	21.30
Fe2O3	.68	1.54	3.38	.32
FeO	1.16	3.90	3.35	.52
MnO	.05	.14	.11	.03
MgO	4.10	8.73	15.60	1.90
CaO	16.28	12.56	11.91	10.50
Na2O	.61	1.01	1.06	1.83
K2O	.87	1.55	.28	.20
P2O5	.03	.02	.03	.01
H2O+	1.49	2.43	2.12	.57
H2O-	.18	.10	<.10	.23
CO2	.15	.52	.14	.28
Rest	.21	.38	.24	.14
Total	100.40	99.74	100.39	99.34

Trace elements in parts per million

Ba	186	171	-	152
Li	5	5	3	4
Rb	26	50	4	5
Sr	402	178	94	345
Pb	7	6	2	16
Th	2	8	<2	23
U	1	<1	<1	<1
Zr	9	14	15	26
Nb	<2	<2	<2	<2
Y	<2	3	3	2
La	4	18	<2	10
Ce	8	34	<3	13
Nd	<3	11	<3	3
Sc	7	12	12	4
V	15	58	71	10
Cr	761	1835	1428	363
Ni	100	276	-	72
Cu	3	3	4	5
Zn	15	45	10	10
Sn	<2	<2	<2	<2
W	-	-	-	<3
Mo	<3	<3	<3	<3
Ga	17	15	13	13
As	<1.00	2.00	<1.00	.50
Be	-	-	-	2
Bi	-	-	-	<2

APPENDIX 3

Samples collected along the Papunya-Kintore road

Sample number	88094401C	88094400A	88094404	88094405A
Lithology	Dolerite	Quartzofe. gneiss	Quartzofe. gneiss	granite
Map name	Mount Rennie	Mount Rennie	Mount Rennie	Mount Liebig
SiO2	47.31	66.46	67.62	75.91
TiO2	.46	.93	.90	.02
Al2O3	19.68	13.83	13.04	13.68
Fe2O3	.87	2.61	2.47	.32
FeO	6.58	3.65	3.51	.14
MnO	.12	.10	.11	.07
MgO	9.72	1.50	1.09	.13
CaO	12.71	3.63	3.07	1.19
Na2O	1.58	2.88	2.93	4.08
K2O	.13	3.67	3.78	3.87
P2O5	.05	.21	.19	.01
LOI	.76	.58	1.15	.34
Rest	.28	.23	.23	.21
Total	100.25	100.28	100.09	99.97
O=F,S,Cl	.02	.00	.00	.00
Total	100.22	100.28	100.09	99.97
	Trace elements in parts per million			
Ba	31	646	645	1217
Li	4	20	33	4
Rb	3	170	181	102
Sr	138	148	128	239
Pb	3	26	26	35
Th	<2	24	24	6
U	<.50	3.00	5.00	1.50
Zr	26	237	263	39
Nb	273	12	14	4
Y	11	54	58	26
La	<2	48	56	13
Ce	6	89	100	22
Nd	3	41	46	9
Pr	-	9	11	2
Sc	28	18	13	3
V	146	87	45	<2
Cr	446	15	8	<1
Mn	1007	757	933	552
Co	71	75	48	53
Ni	273	12	7	3
Cu	96	21	3	<1
Zn	52	74	83	10
Sn	<2	5	5	<2
Mo	<2	<2	<2	<2
Ga	15	20	18	15
As	2.00	3.00	1.50	.50
S	500	<100	<100	<100
Be	<1	3	3	1
Ag	2	1	1	<1
Bi	4	2	<2	<2
Hf	2	10	11	2
Ta	<2	<2	<2	6
Cs	<3	7	8	<3
Ge	<1	<1	<1	<1

Sample number	88094407A	88094407B
Lithology	quartzofe. gneiss	quartzofe. gneiss
Map name	Mount Liebig	Mount Liebig
SiO2	69.74	69.97
TiO2	.55	.57
Al2O3	13.67	13.39
Fe2O3	1.41	1.28
FeO	2.35	2.44
MnO	.07	.07
MgO	.95	.95
CaO	2.44	2.50
Na2O	2.75	2.66
K2O	5.07	5.29
P2O5	.10	.10
LOI	.67	.65
Rest	.23	.23
Total	100.00	100.10
	Trace elements in parts per million	
Ba	435	444
Li	23	17
Rb	349	352
Sr	86	91
Pb	36	38
Th	75	72
U	10.00	15.50
Zr	269	285
Nb	14	15
Y	66	64
La	63	72
Ce	132	129
Nd	47	50
Pr	12	16
Sc	10	10
V	41	41
Cr	10	10
Mn	533	531
Co	84	50
Ni	11	10
Cu	13	18
Zn	51	47
Sn	9	9
Mo	<2	<2
Ga	16	19
As	.50	1.00
S	<100	<100
Be	3	3
Ag	<1	<1
Bi	<2	<2
Hf	12	12
Ta	<2	<2
Cs	12	11
Ge	<1	<1