PNC EXPLORATION (AUSTRALIA) PTY. LTD.
PERTH OFFICE

HARTS RANGE PROJECT
FINAL REPORT ON EL 7993
26th March 1993 to 24th March 1995

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SUMMARY

PNC Exploration (Australia) Pty Ltd has undertaken exploration for uranium, on its Harts Range project in the eastern Arunta Inlier, since the grant of its initial group of tenements (EL's 7967, 7990 to 7994 and 8036) on 26th March 1993.

EL 7993 which comprised part of PNC's Harts Range project, is situated within the south east corner of the Alcoota (SF/53-10) 1:250,000 sheet, just to the north west of the Harts Range Police Station.

Exploration during the 1993 and 1994 tenement years included heliborne and vehicular supported regional geological reconnaissance, radiometric prospecting, mapping and rock chip sampling. Eight geochemical and three petrographic analyses were undertaken on selected rock chip grab samples by Multilabs Pty Ltd and Amdel respectively.

This field work failed to locate any significant radiometric, geochemical or geological targets that warranted further follow-up work. As a consequence of these poor results and increased prospectivity in other Harts Range project tenements, PNC voluntarily relinquished the whole of EL 7993 on 24th March 1995 just prior to the second anniversary of the tenement (26th March 1995).

This report outlines all work undertaken by PNC Exploration (Australia) Pty Ltd on EL 7993 since inception (26th March 1993) till relinquishment (24th March 1995).

1.0 INTRODUCTION

Exploration Licence 7993 was granted on the 26th March 1993 for a period of six years. It comprised part of PNC's Harts Range Project, which is situated in the Harts Range area of the eastern Arunta Inlier. EL 7993 is situated in the south east corner of the Alcoota 1:250,000 sheet, principally within the Mt Riddoch pastoral lease (PPL 989). Following two years of exploration for uranium, wherein no significant uranium mineralisation was discovered, the tenement was voluntarily relinquished on the 24th March 1995.

Exploration during the two years of occupation was previously reported on in the 1993 and 1994 Combined Annual Reporting on the Harts Range Project, which were submitted in March 1994 and 1995 respectively. However, whilst PNC maintains title and continues to explore on its Harts Range Project, these Combined Annual Reports will remain on closed file.

This report therefore comprises the Final Report on EL 7993 and covers all work done on the tenement from its inception (26th March 1993) to its relinquishment (24th March 1995). Due to somewhat limited outcrop (in stark contrast to the rest of the Project area) and poor results, exploration was somewhat limited, resulting in expenditure commitments not being met during both years of occupancy. Exploration included: heliborne and vehicular supported geological reconnaissance, regional mapping, radiometric prospecting and rock chip sampling; geochemical analysis; petrological examinations; geological interpretation; compilation & reporting and assessment of tenement prospectivity.

2.0 LOCATION AND ACCESS

The Harts Range Project area is located in the eastern Arunta Inlier, at the adjoining corners of the Alcoota (SF/53-10), Alice Springs (SF/53-14), Huckitta (SF/53-11) and Illogwa Creek (SF/53-15) 1:250,000 sheets, some 150 km east-north east of Alice Springs. The general location of the Harts Range Project area is shown on Figure 1. EL 7993 is located in the south east corner of the Alcoota Sheet and lies principally, if not wholly, within the Mt Riddoch Pastoral Lease (PPL 989). It lies just Northwest of the Harts Range Police Station and straddles the Plenty River. The location of EL 7993, within the Harts Range Project group of tenements, is shown in Figure 2.

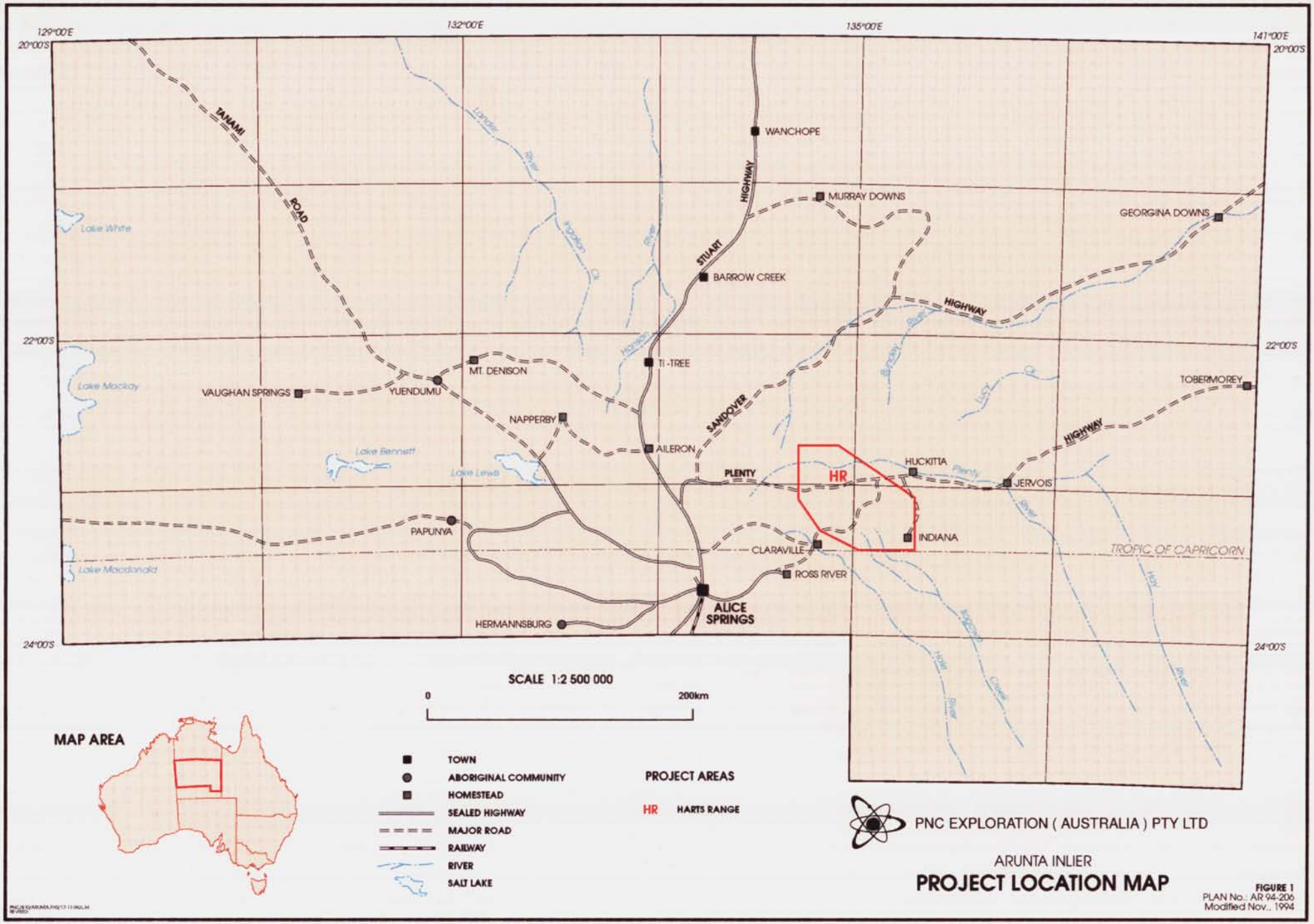
Access from Alice Springs to the Project area is by public and private station roads, via the Arltunga Historical Reserve, Claraville Station and Brumby Bore. Access from PNC's base camp to EL 7993 was via private station roads to Claraville Station, Gough Dam and Kong Bore, thence east along the Plenty Highway to one of a number of station roads heading north into the tenement area. Alternative access from Alice Springs to EL 7993 is north along the Stuart Highway, thence east along the Plenty Highway. Well maintained airstrips are located at the Harts Range township and at Mt Riddoch Station.

3.0 TENEMENT DETAILS

PNC took up six Exploration Licences (7967, 7990 to 7994 and 8036) within the Harts Range region of the eastern Arunta Inlier on the 26th March 1993. A further five Exploration Licences (EL's 8148, 8220, 8675, 8901 and 8906) were granted on the 9th July 1993, 22nd September 1993, 15th June 1994, 18th November 1994 and the 9th January 1995 respectively. These eleven tenements, initially totalled some 865 blocks (2787 km2). At the time of writing, a further three Exploration Licences Applications were pending (ELA's 9031, 9032 and 9149). All of these Exploration Licences formed part of PNC's Harts Range Project,

Project reporting status was granted for EL's 7967, 7990 to 7994, 8036, 8148 and 8220 on the 2nd February 1994. As a consequence, the 1993 and 1994 Annual Reports on these tenements were lodged as combined Project Reports in March 1994 and 1995 respectively. An application for project reporting status on the more recent EL's 8675, 8901, 8906 and ELA's 9031 and 9032 was made on the 23rd March 1995.

At the end of the second year of occupation of the initial six Exploration Licences PNC effected statutory surrenders of the Project area in accordance with the NT Mining Act. Exploration Licences 7990, 7991, 7992 and 7993 were reduced by 50% on the 25th March 95, whilst EL 7993 was voluntarily wholly surrendered



PNC EXPLORATION (AUSTRALIA) PTY LTD

ARUNTA INLIER

PROJECT LOCATION MAP

FIGURE 1
PLAN No.: AR 94-206
Modified Nov., 1994

(relinquished) on the 24th March 1995. Applications to defer the surrenders on EL's 7967 and 8036 for a 12 month period were granted on the 13th April 1995.

The location of all the Harts Range tenements, including the relinquished EL 7993, are shown in Figure 2.

4.0 PUBLISHED INFORMATION

The Bureau of Mineral Resources, Geology and Geophysics (BMR), now known as the Australian Geological Survey Organisation (AGSO), published geological maps and explanatory notes for the ALCOOTA (Shaw, 1975) and ALICE SPRINGS (Shaw, 1983) 1:250,000 map sheets in 1975 and 1983 respectively. The BMR and the Northern Territory Geological Survey (NTGS) jointly published the geological map and explanatory notes for ILLOGWA CREEK (Shaw, 1985) 1:250,000 map sheet in 1985. The NTGS completed the 1;250,000 geological coverage of the eastern Arunta Inlier when it published the geological map and explanatory notes for the HUCKITTA (Freeman, 1986) sheet in 1986. Geological maps have also been published for the Dneiper, Jervious, Jinka, Laughlen, Limbla, Quartz and Riddoch, and parts of Alice Springs, Fergusson Range and Undoolya 1:100,000 sheets. A number of special maps have also been published for the eastern Arunta Inlier.

Although the BMR has not published a Bulletin on the Arunta Inlier, BMR staff published a comprehensive description of the geology in two parts by Stewart, Shaw and Black (1984) and Shaw, Stewart and Black (1984). A number of other research organisations have also been active in undertaking mapping and geochronology in the Arunta Inlier, including Australian National University, Monash University, University of Adelaide, University of Queensland and Newcastle University and have published various papers.

Airborne magnetics is available from BMR/AGSO, however, at a line spacing of 1.6 km or more (ILLOGWA CREEK has an average line spacing of ca 10 km) it is of little assistance. Airborne radiometrics has not been flown over much of the ground.

Previous exploration documented in NTGS reports and open file data has been mainly aimed at mica, gemstones, base metals (mainly in Division 1) and gold near Arltunga (in Division 3 and associated structures). The majority of exploration has been carried out by prospectors and little systematic exploration has been applied.

5.0 GEOLOGY

5.1 Regional Geology (Arunta Inlier)

The regional geology of the Arunta Inlier has previously been described by Shaw and Stewart (1975a & b), Stewart, Shaw and Black (1984), and by Shaw, Stewart and Black (1984). These workers developed a stratigraphic model based on facies assemblages and lithological correlations, which used three broad stratigraphic groups or Divisions; with Division 1 rocks being the oldest and Division 3 the youngest. This long established stratigraphic subdivision of the Arunta Inlier is however now under review, following recent extensive geochronological work in the Inlier.

Thevissen & Kepert (1993) and Thevissen (1993) have given the following general description of the three broad stratigraphic Divisions:

Division 1 comprises a sequence of mafic/felsic granulites, which is interlain with lesser pelitic and calcareous metasediments. This sequence is termed the Strangways Metamorphic Complex and was metamorphosed to granulite facies at 1860 Ma. On purely lithological criteria there are many similarities between Division 1 and the Division 2 sequences described below.

Division 2 sequence is largely represented by the Harts Range Group (in the eastern Arunta), a pelitic and calcareous meta-sedimentary assemblage of predominantly amphibolite facies metamorphism. The basal unit of Division 2, the Entia Gneiss, has attained granulite facies but was retrogressed to amphibolite grade at 1400 Ma. As such some writers feel the Entia may be part of the Strangways Division 1 assemblage. The remainder of the Harts Range Group, the Irindina Gneiss and younger Brady Gneiss, show no evidence however of having exceeded amphibolite grade. The age of the Harts Range is poorly constrained but is probably around 2000-1900 Ma. The Bruna Gneiss, a felsic intrusive(?) or possibly extrusive porphyroblastic rock, has been dated at 1750

Ma; this date possibly puts a minimum age to the Harts Range Group. However, at least part of the Bruna Gneiss is arkosic so its intrusive origin is in some doubt. Alternatively it may represent a partly assimilated raft of sediment. Similar but less metamorphosed Division 2 pelitic rocks in the NW Arunta (Lander Rock Beds) have been intruded by the Barramundi age (1850-1820 Ma) Stafford Granite.

Division 3 comprises a sequence of post-orogenic platform sediments, that are sporadically distributed throughout the Arunta Inlier. At least two age groups are recognised; the Reynolds Range Group (1820-1780 Ma) and the Simpsons Gap Metasediments (1660 Ma). The unassigned outliers of Division 3 rocks north of the Harts Range (partly within EL 7993) are likely to be Reynolds Range Group equivalents as they lie in a parallel structural corridor.

The regional geology of the Alcoota 1:250,000 sheet has previously been described by Shaw and Warren (1975). The regional geology of the Harts Range area, including that portion of the Alcoota sheet containing EL 7993, is shown in Figure 3.

5.2 Local Geology (EL 7993)

Exploration Licence 7993 consisted of poorly outcropping Harts Range Group metasediments overlain by and possibly faulted against Division 3 sandstones. A series of pelitic, calcareous and amphibolitic rocks have been mapped but not assigned to particular units of the Harts Range Group as has been the case on adjoining 1:250,000 sheet areas. Thevissen and Kepert (1993) proposed that the unassigned units may be equivalents of the Irindina Gneiss and its Naringa and Riddock Members; however they did not rule out the possibility that the Harts Range Group rocks in this area may correlate with the less prospective Brady Gneiss.

Following the 1993 field season, Drake-Brockman and Kepert (1994), wrote the following about the geology of EL 7993.

Sparse outcrop in the area forms ridges of ortho-amphibolite, quartz rich gneisses and calcsilicate, part of which may be volcanic (eg HR 02076, 02078). Poorly outcropping garnet and biotite gneisses occur between the ridges. To the north is an extensive, well foliated gneissic granite (Queenie Flat Granite) that has previously been correlated with Entia Gneiss but on macrosopic appearances this is unlikely.

Vertically dipping, poorly outcropping Division 3 rocks (meta-quartzite and shale) occur to the north of Queenie Flat Granite. No contacts are observed but regional magnetics suggest it is a fault bounded block. Some calcsilicate near the eastern edge of the tenement may be equivalent to calcareous Brady Gneiss.

Limestone mesas of the Tertiary Waite Formation (TW) occur mainly marginal to the tenement. Highly ferruginous deeply weathered bedrock underlies TW.

Significant detrital garnet (ca 30%) occurs in the Plenty River and its tributaries along the southern edge of the tenement.

A geological compilation of EL 7993, from regional reconnaissance and geological mapping during 1993, is shown in Figure 4.

6.0 EXPLORATORY WORK ON EL 7993

6.1 1993 Field Season

This tenement was not included in the 1993 airborne surveys by Kevron, as it fell outside PNC's main area of interest on its Harts Range Project and because the area contained extensive areas of aeolian sands and/or alluvial soils between sparse outcrops. Consequently, field work was limited to some 29 man days of vehicular and helicopter supported regional geological reconnaissance, mapping, rock chip sampling and radiometric prospecting across all outcrop areas.

Some eight (8) rock chip samples were collected for geochemical analysis (HR 02067 to 02069 and HR 02071 to 02075) and three (3) for petrography (HR 02076 to 02078. The multielement geochemical analyses were undertaken by Multilabs Pty Ltd in Perth; results are presented in Appendix 1. The petrographic descriptions were undertaken by Amdel, and are presented in Appendix 2. Petrographic descriptions are also included for

three rock chip samples collected prior to the grant of the tenement (AR 03026, AR 03027 and AR 03031). The locations of these samples are shown on the geological compilation map for this tenement (Figure 4).

No significant radiometric anomalies or geochemical anomalies, warranting further follow-up, were located during the regional reconnaissance and prospection of this tenement during the 1993 field season.

6.2 1994 Field Season

Due to disappointing and unencouraging results from the 1993 field season work, the prospectivity of this tenement was downgraded at the end of the first year of term. As a result, none of the tenement area was included in the December 1993 Geoterrex airborne survey or in the December 1994 World Geoscience Corporation survey undertaken over other parts of PNC's Harts Range project. The 1994 field season work was thus restricted to further regional reconnaissance and prospection. Some thirteen man days of vehicular and helicopter assisted prospection was undertaken, with all major outcrops being prospected using zig zag traverses. No significant radiometric anomalies were located and no rock chip samples were collected for either geochemical or petrographic descriptions.

7.0 EXPENDITURE

Expenditure during the first year of term (ending 25th March 1994) amounted to $22,282 and during the second year of term (ending 24th March 1995) amounted to $12,381. Copies of the relevant expenditure statements submitted to the NTDME for the years ending 25th March 1994 and 24th March 1995 are included in Appendix 3.

Expenditure during these two years were below committed amounts of $30,000 and $20,000 respectively, due to a combination of low perceived prospectivity, lack of significant results in 1993 and poor results again in 1994. An application for a variation to the expenditure covenant, to cover the $7,718 shortfall for the year ending 25th March 1995, was forwarded to the NTDME in late April 1994. No application to cover the shortfall in the second years expenditure was lodged, as the company had decided to wholly relinquish the tenement.

8.0 CONCLUSION

Regional reconnaissance, mapping and radiometric prospecting during the 1993 and 1994 field seasons (first two years of term), failed to locate any significant radiometric, geochemical or geological targets that warranted further follow-up work. As a consequence, the tenement was voluntarily wholly relinquished on 24th March 1995, just prior to the second anniversary of the tenement.

9.0 REFERENCES

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APPENDIX 1
Geochemical Analyses

GRAB SAMPLE DESCRIPTIONS AND U-Th-BASE & PRECIOUS METALS ASSAYS

Sample Number	EL	Prospect	East AMG	North AMG	Lithological Description	Rock Type	Geol Unit	U ppm	Th ppm	V ppm	Mo ppm	Bi ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Co ppm	Ni ppm	Cr ppm	As ppm	Au ppb	Pt ppb	Pd ppb
HR02067	NT07993	SE QUEENIE	474000.0	7473500.0	lateritised (lim) rock	GOS	Pgf	1.2	54.2	424	1.0	0.0	63	0	22	0.0	4	0	250	13	0	2	3
HR02068	NT07993	CONICAL HILL	483500.0	7470000.0	lateritised (lim) rock	GOS	PHi	1.7	30.8	1040	3.5	0.5	75	0	27	0.0	2	4	320	10	0	i	0
HR02069	NT07993	SE QUEENIE	473500.0	7474000.0	lateritised (lim) rock	GOS	Pgf	2.4	66.1	338	7.0	0.2	79	40	49	0.0	4	10	260	7	0	2	1
HR02071	NT07993	SE QUEENIE	473500.0	7475500.0	lateritised (lim) rock	GOS	Pgf	1.9	46.1	178	1.5	0.0	49	5	26	0.0	4	0	140	3	0	1	1
HR02072	NT07993	N CONICAL HILL	482500.0	7474000.0	lateritised (lim) rock	GOS	PHb	2.0	24.9	318	3.5	0.5	62	15	34	0.0	0	0	230	5	0	1	1
HR02073	NT07993	CAMP HILL	467500.0	7465500.0	lateritised (lim) rock	GOS	PHi	2.8	17.2	798	5.0	0.1	127	0	69	0.0	10	14	250	7	0	0	0
HR02074	NT07993	E YAM CK BORE	472000.0	7468000.0	chl m/a pod in garn qn, with assoc trem-qtz veins	UINT	PHi	0.2	1.6	202	1.5	0.4	38	0	35	0.0	68	496	570	11	0	1	0
HR02075	NT07993	MALLEE BORE	474500.0	7465500.0	brecc lim-qtz vein near gt pod	QV	PHi	0.9	2.3	88	11.0	0.0	33	5	36	0.0	8	16	160	3	0	0	0

GRAB SAMPLE DESCRIPTIONS AND U-Th-ROCK ELEMEMT & MISC ASSAYS

Sample Number	EL	Prospect	East AMG	North AMG	Lithological Description	Rock Type	Geol Unit	U ppm	Th ppm	K %	Na %	Ca %	Al %	Fe %	Mn ppm	P ppm	Ba ppm	Ti ppm	Zr ppm	Ce ppm	La ppm	Nb ppm	Y ppm	Ta ppm	W pp
HR02067	NT07993	SE QUEENIE	474000.0	7473500.0	lateritised (lim) rock	GOS	Pqf	1.2	54.2	0.10	0.06	0.31	5.51	37.70	92	420	4030	4930	29	14	8	10			
HR02068	NT07993	CONICAL HILL	483500.0	7470000.0	lateritised (lim) rock	GOS	PHi	1.7	30.8	0.14	0.04	0.17	5.81	29.90	45	710	90	4960	40	21	13	10			
HR02069	NT07993	SE QUEENIE	473500.0	7474000.0	lateritised (lim) rock	GOS	Pqf	2.4	66.1	0.09	0.02	0.19	4.66	27.10	139	2180	918	1770	18	49	34	6			
HR02071	NT07993	SE QUEENIE	473500.0	7475500.0	lateritised (lim) rock	GOS	Pqf	1.9	46.1	0.06	0.03	0.20	2.22	40.50	81	1160	238	3180	62	49	31	15			
HR02072	NT07993	N CONICAL HILL	482500.0	7474000.0	lateritised (lim) rock	GOS	PHb	2.0	24.9	0.05	0.04	0.16	2.90	19.30	62	530	375	2540	30	25	21	6			
HR02073	NT07993	CAMP HILL	467500.0	7465500.0	lateritised (lim) rock	GOS	PHi	2.8	17.2	0.05	0.04	0.24	3.45	24.30	164	1640	486	10800	35	22	9	11			
HR02074	NT07993	E YAM CK BORE	472000.0	7468000.0	chl u/m pod in garn gn, with assoc trem-qtz veins	UINT	PHi	0.2	1.6	0.17	0.22	4.78	3.32	9.99	1450	610	99	6830	29	18	7	2			
HR02075	NT07993	MALLEE BORE	474500.0	7465500.0	brecc lim-qtz vein near gt pod	QV	PHi	0.9	2.3	0.12	0.08	0.19	1.03	5.82	1830	430	235	310	4	36	17	0			

MULTILAB

Analytical Services for the Mining, Industrial and Agricultural Sectors.

Reference Number : 56647
Samples Received : 22/10/93
Results Reported : 09/11/93
Order Number : 5932

Report Analyte Codes:
L.N.R. Listed but not received
I.S. Insufficient sample for analysis
*SS Duplicate sample analysed (from second split)

MR D KEPERT
P N C EXPLORATION (AUST) P/L
26 LYALL STREET
SOUTH PERTH

WA 6151

ANALYSIS REPORT FOR MINERAL SAMPLES

Approved Signature:

for

Samantha Claudius
Senior Chemist - Quality Control

These results are issued in accordance with terms and conditions as defined in our Schedule of Services, dated August, 1992

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	Au	Aur1	Pt	Pd
Units	ppb	ppb	ppb	ppb
Det.Lim	1	1	0.5	0.5
HR 2067	<1	<1	2.0	2.5
HR 2068	<1		0.5	<0.5
HR 2069	<1		2.0	1.0
HR 2071	<1		0.5	1.0
HR 2072	<1		1.0	0.5
HR 2073	<1		<0.5	<0.5
HR 2074	<1		0.5	<0.5
HR 2075	<1		<0.5	<0.5
Scheme	F50MS	F50MS	F50MS	F50MS

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	Ag	Co	Cu	Mn	Ni	Pb	Zn
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Det.Lim	0.2	2	1	1	2	5	1
HR 2067	<0.2	4	63	92	<2	<5	22
HR 2068	<0.2	2	75	45	4	<5	27
HR 2069	<0.2	4	79	139	10	40	49
HR 2071	<0.2	4	49	81	<2	5	26
HR 2072	<0.2	<2	62	62	<2	15	34
HR 2073	<0.2	10	127	164	14	<5	69
HR 2074	<0.2	68	38	1450	496	<5	35
HR 2075	<0.2	8	33	1830	16	5	36
Scheme	M50AAS	M50AAS	M50AAS	M50AAS	M50AAS	M50AAS	M50AAS

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	Al	Ca	Cr	Fe	K	Mg	Na
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Det.Lim	10	10	10	10	100	10	10
HR 2067	5.51%	3050	250	37.7%	1000	980	550
HR 2068	5.81%	1720	320	29.9%	1400	1140	380
HR 2069	4.66%	1890	260	27.1%	900	800	190
HR 2071	2.22%	2020	140	40.5%	600	460	250
HR 2072	2.90%	1560	230	19.3%	500	700	430
HR 2073	3.45%	2410	250	24.3%	500	940	420
HR 2074	3.32%	4.78%	570	9.99%	1700	12.3%	2160
HR 2075	1.03%	1920	160	5.82%	1200	3490	800
Scheme	M500E6	M500E6	M500E6	M500E6	M500E6	M500E6	M500E6

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	P	V	Ti
Units	ppm	ppm	ppm
Det.Lim	10	2	10
HR 2067	420	424	4930
HR 2068	710	1040	4960
HR 2069	2180	338	1770
HR 2071	1160	178	3180
HR 2072	530	318	2540
HR 2073	1640	798	1.08%
HR 2074	610	202	6830
HR 2075	430	88	310
Scheme	M500E6	M500E6	M500E6

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	As	Ba	Bi	Ce	La	Mo	Nb
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Det.Lim	1	1	0.1	0.05	0.05	0.5	0.5
HR 2067	13	4030	<0.1	14.0	8.00	1.0	10.0
HR 2068	10	90	0.5	21.1	12.7	3.5	9.5
HR 2069	7	918	0.2	48.9	34.0	7.0	5.5
HR 2071	3	238	<0.1	49.1	30.6	1.5	15
HR 2072	5	375	0.5	24.7	21.2	3.5	6.0
HR 2073	7	486	0.1	21.6	9.25	5.0	11
HR 2074	11	99	0.4	18.1	7.00	1.5	2.0
HR 2075	3	235	<0.1	35.7	17.4	11	<0.5
Scheme	M50MS6	M50MS6	M50MS6	M50MS6	M50MS6	M50MS6	M50MS6

Order Number : 5932
Project Code :

Job Number: 56647

ANALYTICAL REPORT

Element	Th	U	Zr
Units	ppm	ppm	ppm
Det.Lim	0.05	0.05	1
HR 2067	54.2	1.15	29
HR 2068	30.8	1.70	40
HR 2069	66.1	2.35	18
HR 2071	46.1	1.85	62
HR 2072	24.9	2.00	30
HR 2073	17.2	2.80	35
HR 2074	1.55	0.15	29
HR 2075	2.30	0.90	4
Scheme	M50MS6	M50MS6	M50MS6

APPENDIX 2
Petrographic Descriptions

PETROLOGICAL ETC SAMPLING REPORT 01/06/95

Sample Number	Easting AMG	Northing AMG	Description	Rock Type	Geol Unit
AR03026	469000.0	7466700.0	ARUNTA ; Fresh unaltered pyroxene amphibolite. Metasediment? Minor quartz. Undippa Dam west of Conical Hill. Possible Harts Range Gp	MGN	PHir
AR03027	469000.0	7466700.0	ARUNTA ; Fresh unaltered pyroxenite, calc-silicate rock. Calcareous metasediment, relict? detrital zircon. Undippa Dam west of Conical Hill. Possible Harts Range Gp	CS	PHir
AR03031	471200.0	7477100.0	ARUNTA ; Micaceous quartzite. Minor metamorphic zircon. Unconformably overlies Harts Range Gp. and Strangways Gp. North of Conical Hill. Mendip Metamorphics.	QTZ	PM
HR02076	480500.0	7467500.0	SW CONICAL HILL; porphyritic ilm-plag-hb ortho-amph, plag porph, weakly banded	MVOL	PHi
HR02077	472000.0	7470000.0	E YAM CK BORE ; garn-cc(?) bearing quartzofels opx gneiss (charnockite?) with cherty lamali cut by foliation (transpositional layering)	CS	PHi
HR02078	480500.0	7467500.0	SW CONICAL HILL; glassy volc with fel and rare lithic porph, next to HR02076	IVOL	PHi

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31 Flemington Street
Frewville SA 5063
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amdel
Amdel Limited
A.C.N. 008 127 802
Telephone (08) 372 2700 Facsimile (08) 379 6623

All *

31 December 1992

PNC Exploration (Australia) Pty Ltd
26 Lyall Street
SOUTH PERTH WA 6151

Attention: Mr D Kepert

REPORT G6851/93
PETROGRAPHIC DESCRIPTIONS OF A SUITE OF SIXTEEN ROCK SAMPLES

YOUR REFERENCE:	Order No. 5507
IDENTIFICATION:	AR 3013, 31016-3019, 3021-3028, 3031-3033
MATERIAL:	Rock samples
DATE RECEIVED:	9 November 1992
WORK REQUIRED:	Thin sections and routine petrographic descriptions
Investigation and Report by:	Dr Alan W Webb and Dr Douglas R Mason

Keith Henley

Dr Keith J Henley
Manager, Mineral Services Laboratory

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

hk

PETROGRAPHIC DESCRIPTIONS OF A SUITE OF SIXTEEN ROCK SAMPLES

1. INTRODUCTION

A suite of 16 rock samples was received from PNC Exploration (Australia) Pty Ltd on 9 November 1992. The samples were from a meta-sedimentary sequence and routine petrographic descriptions of all samples were requested.

2. METHODS

Standard 25×75 mm thin sections (TSC58874-58889) were prepared. Prior to cover-slipping, the sections were stained for calcite using Alizarin red-S solution. Staining of the rock slices with sodium cobaltinitrite was carried out on selected samples to aid in the identification of K-feldspar.

Conventional transmitted polarised light microscopy was used to prepare routine petrographic descriptions.

3. PETROGRAPHIC DESCRIPTIONS

The individual petrographic descriptions follow.

amphib – EHir/EHia

Undippa Dam

SAMPLE: **AR3026**

ROCK NAME: **Massive pyroxene amphibolite**

HAND SPECIMEN:

The rock is medium and even grained with no evidence of any mineralogical layering.

THIN SECTION: **C58884**

An optical estimate of the constituents gives the following mineralogical composition :

Mineral	Vol. %	Origin
Hornblende	45	Metamorphic
Plagioclase	45	Metamorphic
Pyroxene	5	Metamorphic
Sphene	1-2	Metamorphic
Quartz	2	Metamorphic
Opaques	Tr	Metamorphic

The rock is medium grained, with the largest hornblende grains being less than 2 mm and plagioclase being 0.5 to 1 mm in size. The texture is granoblastic, particularly in plagioclase-rich areas and with the finer grained hornblende. The coarser hornblende is anhedral, plate-like and weakly poikiloblastic, enclosing plagioclase, quartz and pyroxene (which it appears to be replacing).

The hornblende has a strong pleochroism in shades of brown. As noted above, it appears to be replacing pyroxene. This latter mineral is smaller, usually about 0.5 mm and appears to be altering along internal cracks. Many of the original grain outlines remain.

The plagioclase is fresh, strongly twinned, and locked in clusters of grains between the larger plates of hornblende. Much of the twinning is lenticular and is probably strain induced.

Quartz is of only minor abundance and occurs as occasional interstitial grains and round inclusions within hornblende.

Sphene is fresh and forms relatively large, equant or rounded grains. Opaques are rare, and are elongated or skeletal and probably ilmenite.

INTERPRETATION:

This rock was produced by a high amphibolite to granulite grade metamorphism and has undergone only a weak retrogression of pyroxene being replaced by amphibole. All other minerals are in completely fresh condition. The non-foliated texture of the rock suggests an absence of directional stress during metamorphism.

calcsil marginal to AR3026

Undippa Dam

SAMPLE: **AR3027**

ROCK NAME: **Massive pyroxenite, with scapolite pods**

HAND SPECIMEN:

The rock is massive, fine grained, and pale grey in colour. On two opposing edges of the hand specimen is a thin selvage of a creamy-white mineral that may represent a vein or, alternatively, a small pod.

THIN SECTION: C58885

An optical estimate of the constituents gives the following mineralogical composition :

Mineral	Vol. %	Origin
Clinopyroxene	85	Metamorphic
Scapolite	10	Metamorphic
Amphibolite	5	Metamorphic
Zircon	Tr	?Relict detrital

The rock has an even grained, granular texture and in places is virtually monomineralic and could be termed a pyroxenite. The scapolite is present, mainly in a small pod, although occasional grains are scattered throughout the section. The white selvage noted in hand specimen is also composed of scapolite, which is much coarser grained (up to 5 mm) than elsewhere in the rock.

The pyroxene is colourless, randomly oriented and 0.1 to 0.5 mm in size. It is fresh and unaltered and has sharp margins where it is in contact with hornblende.

The hornblende occurs as pale brown, pleochroic grains, mainly intergrown with the pyroxene. Larger grains tend to be poikiloblastic, enclosing small pyroxene crystals. The hornblende is distributed sparsely through the section. Small, prismatic grains of hornblende also occur within the massive scapolite zone.

Scapolite, in the area at the edge of the sample, forms large and elongated, prismatic crystals, in contrast to the smaller pod within the pyroxenite where the mineral is equidimensional. The scapolite is colourless and very fresh.

INTERPRETATION:

This sample represents recrystallisation of a sedimentary calc-silicate rock, under conditions of moderately high grade regional metamorphism. This produced the granoblastic assemblage of pyroxene + scapolite + hornblende. The irregular distribution of scapolite may reflect primary sedimentary compositional differences.

quartzite, Division 3
EM
poss Mendip Metamorphics

SAMPLE: **AR3031**

ROCK NAME: **Micaceous quartzite**

HAND SPECIMEN:

The rock is a massive, cream coloured quartzite with a fine grained sugary (saccharoidal) texture. There is a weak lamination, and in some orientations the grains can be seen to be elongated parallel to the lamination. White mica flakes are sparsely distributed through the rock. Brown limonitic staining is probably a recent weathering effect.

THIN SECTION: C58887

An optical estimate of the constituents gives the following mineralogical composition :

Mineral	Vol. %	Origin
Quartz	97	Metamorphic
Muscovite	3	Metamorphic
Zircon	Tr	Metamorphic

This rock is an even grained, fairly pure quartzite with a grain size mainly in the 0.4 to 0.1 mm range. There is a well developed granoblastic texture and a well defined foliation produced by the alignment of the slightly elongated quartz crystals and by the parallelism of the muscovite flakes. There is also a weak limonitic staining along grain boundaries which seem to favour boundaries in the foliation plane, thus accentuating the foliation appearance. The quartz grains show little or no sign of strain.

The muscovite flakes are up to 1 mm in length, but are mostly smaller than this.

Zircon occurs as a few scattered grains, none of which exceeds 20 μm in size.

INTERPRETATION:

This sample represents a very siliceous rock that has recrystallised under conditions of directional strain to produce the foliation noted. The precursor rock may have been a well-sorted quartzose sandstone with minor aluminous impurities (eg clays or detrital phyllosilicate material).

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15 November 1993

Mr D Kepert
PNC Exploration (Australia) Pty Ltd
26 Lyall Street
SOUTH PERTH WA 6151

REPORT G824400G/94
PETROGRAPHIC DESCRIPTIONS FOR A SUITE OF TWENTY SIX ROCK SAMPLES

YOUR REFERENCE:	Order No. 5930
SAMPLE IDENTIFICATION:	As per sample bags
MATERIAL:	Rock samples
DATE RECEIVED:	25 October 1993
WORK REQUIRED:	Thin sections, routine petrographic descriptions
Investigation and Report by:	Dr Douglas R Mason

Keith Henley

Dr Keith J Henley
Manager, Mineral Services Laboratory

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

hk

PETROGRAPHIC DESCRIPTIONS FOR A SUITE OF TWENTY SIX ROCK SAMPLES

SUMMARY

1. A suite of twenty six (26) rock samples has been studied using petrographic and limited X-ray diffraction methods.

2. Rock type names

SAMPLE	ROCK NAME
AR3057	Mylonitic meta-acid igneous rock
AR3058	Deformed laminated graphitic meta-pelite
AR3060	Quartz-epidote rock
AR3062	Meta-adamellite
HR02056	Amphibolite (?ortho-amphibolite)
HR02062	Anthophyllite rock
HR02063	Anthophyllite rock
HR02076	Amphibolite (ortho-amphibolite)
HR02077	Quartzo-feldspathic pyroxene gneiss (charnockite)
HR02078	Porphyroclastic meta-sediment (meta-?tillite)
HR02110	Actinolite-chlorite-talc rock (meta-?ultramafite)
HR02113	Epidote-quartz rock
HR02114	Epidote-quartz calc-silicate rock
HR02115	Banded epidote-quartz calc-silicate rock
HR02116	Laminated diopside-hornblende calc-silicate rock
HR02117	Banded siliceous calc-silicate rock
HR02415	Banded plagioclase-hornblende calc-silicate gneiss
HR02416	Amphibolite
HR02417	Pyroxene amphibolite (?ortho-amphibolite)
HR02418	Amphibolite (?para-amphibolite)
HR02419	Amphibolite (?ortho-amphibolite)
HR02420	Amphibolite (?ortho-amphibolite)
HR02421	Laminated calc-silicate rock (para-amphibolite)
HR02422	Nodular pyroxene-plagioclase calc-silicate rock
HR02429	Banded calc-silicate rock (para-amphibolite)
HR03491	Quartzo-feldspathic gneiss

3. Metamorphism

   - Most of the samples display mineralogies and textures indicative of recrystallisation under conditions of dynamic regional metamorphism in the middle to upper amphibolite facies. Rare samples may have progressed into the granulite facies.

- Many of the samples are amphibolites (hornblende-plagioclase rocks). Some are clearly of meta-sedimentary origin, and appear to be part of a calc-silicate sedimentary sequence. Other amphibolites may be of meta-igneous origin (i.e. ortho-amphibolites), but there is only limited support for this interpretation.

PETROGRAPHIC DESCRIPTIONS FOR A SUITE OF TWENTY SIX ROCK SAMPLES

1. INTRODUCTION

A suite of twenty six (26) rock samples was received from Mr. Doug Kepert (PNC Exploration Aust. Pty. Ltd., South Perth, Western Australia) on 25 October 1993.

Particular requests were to provide routine petrographic descriptions for each of the samples.

This report contains the full results of this work.

2. METHODS

The samples were examined in hand specimen, section lines were marked, and standard 25mm x 75mm thin sections (C60860-C60885) were prepared.

Prior to cover-slipping, the sections were stained for calcite using Alizarin Red-S solution, which stains calcite pink but leaves other minerals (including other carbonates) unaffected.

Routine petrographic descriptions were prepared using conventional transmitted polarised light microscopy.

Where some doubt existed in the optical identification of minerals in some samples, X-ray diffraction methods were used to positively identify the minerals. This was necessary for samples HR02062 (orthoamphibole-rich rock), HR02063 (orthoamphibole-rich rock), and HR02113 (unusual colour of epidote in epidote-rich rock). The results are presented in Table 1, and are mentioned in the petrographic descriptions.

3. PETROGRAPHIC DESCRIPTIONS

The routine petrographic descriptions are presented in the following pages.

SAMPLE: HR02076

ROCK NAME: Amphibolite (ortho-amphibolite)

HAND SPECIMEN:
The rock sample displays a typical amphibolite appearance, with scattered larger white feldspar crystals. Most of the rock is composed of abundant even-grained black ferromagnesian grains and white feldspar grains, forming a lineated but uniform matrix.

THIN SECTION: C60873

An optical estimate of the constituents gives the following:

Mineral	Vol.%	Origin
Hornblende	58	metamorphic
Plagioclase	40	metamorphic
Opaques (?ilmenite)	2	metamorphic

In thin section, this sample displays an even-grained granoblastic metamorphic texture with moderate lineation. Possible relict porphyritic igneous texture has been preserved.

Hornblende and plagioclase occur in subequal abundance, and comprise most of the rock.

Hornblende forms anhedral grains ~0.4 mm in average size, but elongated grains display a preferred orientation that defines a moderately developed lineation. It is pleochroic from pale buff brown to greenish tan brown, the colour suggesting a moderately high Ti and Al content (i.e. appropriate to higher grades of metamorphism).

Plagioclase occurs in two forms. Most occurs as anhedral grains in granoblastic relationship to the hornblende, but somewhat finer grained (~0.2-0.3 mm). A lesser amount of plagioclase occurs as larger crystals that display squat, subrounded prismatic forms that are appropriate for relict igneous phenocrysts rather than metamorphic grains. Some of these large plagioclase crystals contain scattered inclusions of small hornblende grains, most likely formed by replacement of precursor ferromagnesian inclusions (e.g. pyroxene) within the plagioclase phenocrysts. In places, they form polycrystalline aggregates that may have been primary glomerocrystic aggregates. All of the plagioclase is quite fresh.

Opaques occur in minor amount as small (~0.1-0.2 mm) anhedral, subhedral and lobate grains that are more-or-less uniformly disseminated through the rock.

INTERPRETATION:

This sample has suffered recrystallisation under conditions of dynamic regional metamorphism in the upper amphibolite facies. This is supported by the even-grained, more-or-less equilibrium-textured granoblastic assemblage, and the colour (and inferred

composition) of the hornblende. The precursor rock was a porphyritic basalt, originally composed of ~20% of plagioclase phenocrysts in a groundmass of plagioclase, pyroxene and opaques. All of these phases have been recrystallised during the metamorphic event, except the plagioclase phenocrysts which have suffered replacement but not recrystallisation.

SAMPLE: HR02077

ROCK NAME: Quartzo-feldspathic pyroxene gneiss (charnockite)

HAND SPECIMEN:
The rock sample is an even-grained, crystalline, greenish grey rock with sparsely scattered small pink anhedral garnet grains. Lineated quartz stringers stand proud on the weathered surface, and are not evident in the sawn surface which is more-or-less at right angles to the weathered surfaces.

THIN SECTION: C60874

An optical estimate of the constituents gives the following:

Mineral	Vol.%	Origin
Quartz	45	metamorphic
Biotite	15	metamorphic
Pyroxene	20	metamorphic
Plagioclase	15	metamorphic
Garnet	1	metamorphic
Hornblende	2	metamorphic
Calcite	2	metamorphic
Apatite	Tr	metamorphic
Tourmaline	Tr	metamorphic
Zircon	Tr	?relict primary

In thin section, this sample displays a foliated granoblastic metamorphic texture.

Quartz is abundant. It occurs as strained anhedral grains of widely variable size, ~0.1-2.0 mm. Most quartz-quartz grain boundaries display intricate suturing, indicative of recrystallisation. Some polycrystalline quartz aggregates occupy large ovoid or elongated sites up to ~2 mm in size, and have the appearance of relict primary quartz sites (?phenocrysts, ?phenoclasts). Quartz also occupies highly elongated (lineated) stringers that lie subparallel to the foliation trace.

Biotite forms flakes ~0.4 mm in average size, and its pleochroism (foxy reddish brown to pale yellow) suggests a relatively reduced composition (i.e. relatively high $Fe^{2+}/(Fe^{2+}+Fe^{3+})$). Its preferred alignment defines a foliation through the rock. It is more-or-less uniformly distributed throughout the rock.

Pyroxene is moderately abundant and also is more-or-less uniformly distributed through the rock. It occurs as anhedral grains commonly ~0.4 mm in size, but ranging up to ~1 mm. Elongated grains are aligned within the trace of the foliation plane. Most of the pyroxene appears to be clinopyroxene (augite), but some has parallel extinction and somewhat lower birefringence suggestive of orthopyroxene.

Hornblende is uncommon, occurring as ragged pale green anhedral grains, commonly overgrown on pyroxene grains. In places it forms ragged replacement patches in pyroxene.

Plagioclase occurs in moderate amount as anhedral grains ~0.2-0.4 mm in size. It is twinned and quite fresh.

Garnet occurs as relatively large anhedral poikiloblastic grains, very sparsely scattered through the rock. They enclose smaller subrounded grains of quartz, plagioclase and pyroxene.

Apatite forms small equant prismatic accessory grains. Tourmaline is rare, forming amoeboid anhedral grains pleochroic in brownish greens, and closely associated with biotite. Zircon is rare, occurring as very small stumpy prisms within quartz and biotite.

Calcite occurs as angular grains that commonly occur interstitially to other phases. In places it accompanies hornblende where it has replaced pyroxene.

INTERPRETATION:

This sample represents a quartzo-feldspathic rock that has suffered dynamic regional metamorphism of high grade (granulite facies). This generated the foliated granoblastic assemblage of quartz + biotite + two pyroxenes + plagioclase + minor garnet + apatite + tourmaline. Minor hornblende and calcite appear to be retrogressive phases that may have formed during waning stages of the principal metamorphic event.

Deformation during the metamorphic event resulted in ductile elongation of large primary quartz grains, producing lineated quartz rods.

All primary mineralogical and microtextural features appear to have been destroyed, making identification of the precursor rock difficult. However, it may have been a mesocratic igneous rock, as inferred from the bulk composition, the uniform (non-layered) mineralogy, and the inferred presence of large primary quartz grains.

SAMPLE: HR02078

ROCK NAME: Porphyroclastic meta-sediment (meta-?tillite)

HAND SPECIMEN:
The rock sample contains angular white crystal fragments and aggregates that are irregularly scattered through a fine-grained foliated greenish grey matrix.

THIN SECTION: C60875

An optical estimate of the constituents gives the following:

Mineral	Vol.%	Origin
Plagioclase	20	relict phenoclasts
K-feldspar	5	relict phenoclasts
Lithics	2	relict phenoclasts (granitoid)
Biotite	20	metamorphic
Quartzo-feldspathic mosaic	53	metamorphic
Epidote	Tr	metamorphic
Apatite	Tr	metamorphic
Sphene	<1	metamorphic
Zircon	Tr	?relict primary grains

In thin section, this sample displays a relict porphyroclastic sedimentary texture that has been modified by dynamic regional metamorphism of low to moderate grade.

Plagioclase occurs mostly as subhedral to subrounded crystal fragments that range widely in size from ~0.2 mm up to several mm. They are twinned and quite fresh, and have been partly rotated into the trace of the foliation plane.

K-feldspar (orthoclase) occurs as angular crystal fragments similar in size to plagioclase. It displays incipient inversion to microcline.

Angular to subrounded fragments of granitoid texture and mineralogy are sparsely scattered through the rock. The largest fragment in the section is an example. They are composed of intergrown plagioclase, orthoclase, quartz, and minor well-crystallised flakes of foxy reddish brown biotite. Most fragments display deformation and partial recrystallisation around margins or in thin bands subparallel to the foliation.

Biotite is abundant throughout the matrix of the rock. It forms small, poorly-crystallised, drag brown flakes that tend to be entrained in thin anastomosing subparallel trails that define the foliation through the rock. Intimately intergrown with the biotite is fine-grained quartz and probably some feldspar. In places, quartz tends to form thin elongated trails.

Epidote is rare, occurring as fine granular aggregates near margins of some feldspar grains.

Sphene is present in minor amount as disseminated small porphyroblastic grains up to ~0.4 mm in size.

Apatite is rare, occurring as small colourless stumpy prismatic crystals disseminated through the matrix.

INTERPRETATION:

This sample retains primary textural and mineralogical features that suggest it formed as a poorly-sorted, compositionally immature, porphyroclastic sedimentary rock. It may have been a tillite, as inferred from the widely variable phenoclast particle size, the coarse acid crystalline nature of the lithic phenoclasts, and the relatively "muddy" initial composition of the matrix. The presence of abundant feldspar as phenoclasts might be taken to indicate a possible tuffaceous origin, but this is not considered reasonable given the acid granitoid nature of the lithic fragments.

The rock has suffered deformation and recrystallisation during dynamic regional metamorphism, possibly in the upper greenschist to lower amphibolite facies.

APPENDIX 3
Expenditure Statements

Tenement No: EL 7993

Reporting Period	**26/03/94 to 25/03/95**
Anniversary Date:	**26/03/95**
Commitment	**$20,000**

Summary of Operations and Expenditure

GENERAL PROSPECTING	
Dozing/Grading	$43
Chemical Analysis	$455
Petrography	$193
Helicopter Charter	$1,726
REMOTE SENSING/SURVEYS/RESEARCH	
Environmental	$62
Other services & Research	$26
Earthworks	$431
OVERHEADS	
Drafting/Plan Printing	$421
Head Office Overheads	$1,126
Rental	$80
LABOUR COSTS	
Salaries & Wages	$5,484
Field Expenses	$1,546
Project Office Expenses	$202
Travel & Accommodation	$586
TOTAL	**$12,381**

Tenement No:	*EL7993*
Anniversary Date:	*25/03/94*
Commitment:	*30000*

General Prospecting:	
Chemical Assay (12samples)	533.24
Petrography	664.16
Remote Sensing & Airborne Surveys:	
Aerial Photgraphy	76.43
Airborne Geophysical	3463.64
Ground Geophysical:	
Rental Survey Equipment	16.11
Overheads:	
Drafting	814.51
Computing	
Plan Printing	170.22
Head Office Overheads	2337.93
Labour Costs:	
Salaries/Wages	7419.33
Field Expenses	3882.22
Project Office Expenses	1694.63
Rental	118.20
Travel & Accomodation	932.97
Research/Other Services	158.53
	22282.12

EL 7993

134°39'

134°52'

22°47'

22°57'

Table Hill Dam

Queenie Flat Dam

Yam Creek Bore

Undippa Dam

Mallee Bore

Pinnacle Bore

Conical Hill

Corkwood Bore

Corkwood Well

To Mt Riddock Homestead

HR02070

HR02071

HR02072

HR02073

HR02074

HR02075

HR02076/78

HR02077

HR02067

HR02069

HR02068

PM

PM/PHb?

PHb

PHi

Pgf

PS?

Tw

Tlf

YAM CREEK

PLENTY RIVER

ATURPA CK

ULCARRA CK

ROCK TYPE

- Track/Fence
- Bore
- Well
- Dam
- Creek
- Peak
- Sample
- Dip and strike of foliation
- Sub-surface trend line
- Shear
- Fault
- Fault (inferred)
- Stratigraphic boundary (inferred)

- a Amphibolite (?ortho)
- b Biotite gneiss
- b Meta basic volcanic
- cs Calcsilicate (quartz rich)
- f Quartzo feldspathic gneiss
- g Granite
- gg Granitic gneiss
- j Quartz rich mentasediment
- v Garnet-biotite gneiss
- vf Garnet bearing felsic gneiss
- z Sillimanite bearing gneiss

TERTIARY

- Tw Waite Formation - limestone

- Tlf Deeply weathered ferruginous bedrock

PROTEROZOIC

- Pgf Queenie Flat Granite

DIVISION 3

- PM Mendip Metamorphics - quartzite and schists

DIVISION 2 - Harts Range Group

- PHb Brady Gneiss
- PHi Irindina Gneiss

DIVISION 1

- PS Strangways Metamorphic Complex

CR95/475

PNC EXPLORATION (AUSTRALIA) PTY LTD

HARTS RANGE PROJECT

GEOLOGICAL COMPILATION OF EL 7993

SCALE 1:50 000

0 1 2 3 4 5

kilometres

compiled: D. Kepert	date: Dec '93	drawing no.:
drawn: Co-ordinated Drafting	revised:	PLATE 28

FIGURE 4

135°00'

23°00'

EL 7993

EL 7994

EL 8220

EL 7992

EL 8908

EL 8148

EL 7990

EL 9031

EL 9032

EL 9149

EL 8803

EL 7991

PNC TENEMENTS

RELINQUISHED TENEMENTS

ROCK TYPE

LEGEND

- POST DEVONIAN
- A — AMADEUS BASIN SEDIMENTS
- R — RETROGRADE SHEAR ZONES
- 3 — DIVISION 3
- GRANITES
- METAPELITES
- METAPSAMMITES
- CALCSILICATES
- AMPHIBOLITES
- META BASIC ROCKS
- PORHYRITIC GRANITE
- GNEISSES
- 1 — DIVISION 1 & PRE-DIVISION 1

DIVISION 2

SCALE 1:250 000

0 10 20

kilometres

CR95/475

PNC EXPLORATION (AUSTRALIA) PTY LTD

HARTS RANGE AREA

GEOLOGICAL MAP

COMPILED: M.MIYADA	DATE: JULY, 1993
DRAWN: CO-ORDINATED DRAFTING	PLAN No: FIGURE 3

FIGURE 2

PNC EXPLORATION (AUSTRALIA) PTY LTD

TENEMENT LOCATION MAP

HARTS RANGE PROJECT

Drawn : Co-Ordinated Drafting	Revised : JUNE '95	Date : March '95
Centre : Perth	Job No.95-073/95-122	Drw No. : hrten.dgn

CR95/475

GEOLOGICAL LEGEND

- Prospect
- Mineral Occurrence
- Abandoned Mine
- Coalsan / Open Cut
- As Asbestos
- Ap Apatite
- Au Gold
- Be Beryllium
- Bi Bismith
- Ce Cerium
- Cn Corundum
- Cu Copper
- Ep Epidote
- Gn Garnet
- Ky Kyanite
- Mi Mica
- Mo Molybdenum
- Nb Niobium
- Ni Nickel
- Pb Lead
- REE Rare Earth Elements
- Ta Tantalum
- Th Thorium
- Ilm, Ilmr Tourmaline
- U Uranium
- W Tungsten
- Zn Zinc

TOPOGRAPHIC LEGEND

- Road
- Vehicle Track
- Bore, Windmill
- H.S. Building
- Creek
- Dam
- Landing ground
- Trigonometrical station
- abd Abandoned
- E.L. boundary current PNC tenement
- E.L. boundary surrendered PNC tenement areas

E.L. 7993
E.L. 7994
E.L. 7994
E.L. 8220
E.L. 8001
E.L. 9675
E.L. 7992
E.L. 7992
E.L. 8906
E.L. 8148
E.L. 7967
E.L. 8036
E.L. 7990
E.L. 7990
E.L. 9031
E.L. 9149
E.L. 9032
E.L. 7990
E.L. 7991
E.L. 7991

PLENTY HIGHWAY
TROPIC OF CAPRICORN

Image: HRTEN.EPS (Job: HRTEN.SET) [Print- (Type: 4 Color) (Pattern: PS Halftone) (Res: 300 dpi) (Width: 17.460000 in.) (Height: 13.306667 in.) (Overlap: 0.000000 in.) (Row: 1) (Col: 1) (Date: 06/23/95) (Time: 11:06:38) (Toner/Media: Standard -) (Copies: 2 - 2 of 2) (Layers: C-1 M-1 Y-1 K-1)] [Process- (Date: 06/23/95) (Time: 11:02:03) (Total Time: 00:01:42)] (UCC: HRTEN) (Printer CCT: Off)