FIRST AND FINAL REPORT
ON
EXPLORATION LICENCE 3558
ALICE SPRINGS
NORTHERN TERRITORY

Covering the period
11 May 1982 to 10 May 1983

Compiled
by
L. Booth
K.S. Taylor

PERTH
SUMMARY

EL 3558 was one of several tenements examined by UAL in the Northeast Arunta Block during 1982.

Techniques used included geological mapping, ground radiometry, geochemistry and petrography.

The tenement was surrendered at the end of the first year.
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1. INTRODUCTION

Exploration Licence 3558, covering an area of 16 blocks (50 km²) was applied for on 25th February 1982 and granted on 11th May 1982. It is among a number of tenements in the N.E. Arunta Basin examined by Uranerz Australia Pty Ltd (UAL) for uranium mineralization.

Field work was carried out from a trailer camp with UAL's regional office in Alice Springs providing a base for supplies and communications.

The results of the exploration carried out were not encouraging and the tenement was surrendered on 10th May 1983.

2. LOCATION

EL 3558 is located on The Garden Station approximately 75 km northeast of Alice Springs on the ALICE SPRINGS 1:250,000 Sheet SF 53-14.

3. GEOLOGY

The project area is contained within the Arunta Block, a region of igneous and metamorphic rocks exposed between Alice Springs and Barrow Creek, which results from at least two periods of uplift; the first in Proterozoic at about 1700 Ma and the second in the Palaeozoic at about 340 Ma. The rocks of the Arunta Block are subdivided into three lithological divisions based on areal distribution, metamorphic character and stratigraphic position. Division I consists of mafic and felsic rocks almost always metamorphosed to granulite grade. Division II units contain higher proportion of sedimentary rocks while Division III units are characterized by pelites and psammites. Division II units are less deformed than Division III. All units are older than 1800 Ma.
The Arunta Block is cut by numerous major faults or deep seated deformed zones which trend mainly north-northwest. The exploration target models associated with these deformed zones were firstly, uranium associated albititite and secondly, for skarn-type deposits located on the exocontact of uraniferous post-tectonic granites, in calcsilicate lithologies.

4. INVESTIGATIONS AND RESULTS

4.1 Geological Mapping

EL 3558 is part of the major east-trending Ankala-Mt. Laughlen-Ruby Gap retrograde zone and lies just to the east of the Mordor Igneous Complex.

In the tenement, two main areas of retrograde metamorphic rocks have been recognized by the BMR. One is located in the west and the other in a thrust wedge to the south. However, it should be noted that retrograde metamorphic rocks are not restricted to these two areas.

Southern Retrograde Wedge

The Upper Proterozoic Heavitree quartzite crops out to the north and south of the retrograde zone. Thrust faulting is well defined as zones of brecciation, mylonitization, silicification and quartz-epidote veining.

The lithologies of the retrograde metamorphic zone are extremely varied. Their general strike trend is northwest-southeast.

The zone consists predominantly of interlayered coarse granitic gneiss (in which pink feldspar is common), biotite-chlorite gneiss and calcsilicate rocks. In the centre of the zone lies a silicified unit which is interpreted as a massively weathered and silicified
carbonate. It stands out as a topographic high and bears no clear relationship to the surrounding lithologies.

**Northern Retrograde Zone**

This portion of the licence consists of varied metasedimentary lithologies which are interlayered and generally trend north-northwest. Throughout the area numerous hydrothermal veins of quartz, quartz-epidote and quartz-epidote-hematite occur, the majority of which cross-cut the country rocks at shallow angles. These are possibly associated with faulting or thrusting.

The predominant lithologies are biotite and gneiss, coarse granitic gneiss, chlorite-biotite gneiss, quartzofeldspathic gneiss, calc-silicate and para-amphibolite. "Non retrograde rocks" crop out within the zone but are mainly found in the eastern margin. They are of similar composition to the retrograde rocks, but generally appear to lack chlorite component.

4.2 **Ground Radiometry**

A SRAT SPP2 scintillometer was carried during mapping and the readings monitored.

**The Southern Retrograde Wedge**

The Heavitree Quartzite has a low radiometric response (6-90 cps) as does the silicified carbonate (55 cps) and the meta-dolerite (90 cps).

The retrograde rocks have in general a high radiometric background of 150-250 cps. The coarse granitic gneiss was particularly anomalous commonly 400-500 cps.
The Northwest Retrograde Zone

The "non retrograde rocks" have a radiometric background of 80-150 cps, and it was found that a number of the granitic gneisses were radiometrically anomalous (550-1500 cps).

The average radiometric signature of the retrograde unit was higher than the non-retrograde unit (120-250 cps), and coarse-grained granitic gneiss was the most common anomalous rock type with a maximum of 750 cps.

Pink feldspar was common throughout this unit. Other anomalous rock types within the retrograde zone are listed below:

- eudialyte granite (sample 58/30) 500-1200 cps
- biotite-chlorite-muscovite schist (58/32) 500 cps
- biotite-magnetite gneiss (58/35) 350 cps
- quartz, albite, microcline, muscovite-epidote (58/31) 700 cps
- silicified hematite rock adjacent to a quartz vein (58/36) 750 cps

4.3 Geochemistry

Six rock chip samples were analyzed. In all cases the uranium content was very low (>22 ppm); Thorium was generally higher, giving a uranium:thorium ratio of 1:3.5.
5. **STATEMENT OF EXPENDITURE**

5.1 **Exploration Licence 3558**

Covering the period 11 May 1982 to 10 May 1983

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Chief Geologist -------------------------- J. Borshoff
Regional Geologist ---------------------- K. Ferguson
Project Geologist ----------------------- L. Booth

6.2 **Vehicles**

1 Toyota Landcruiser
1 Caravan

6.3 **Instruments**

2 SRAT SPP2 scintillometer
2 GAD-6 spectrometer
1 GSP 3
1 U.V. light
APPENDIX 1

Geochemical Results
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# Analytical Report

## Cover Sheet

**URANERZ AUSTRALIA PTY LTD**

**Submission Date:** August 30, 1982

**Clients Order:** 28025

**Project:**

**Locality:**

**Sample Type:** Pulps

**Distribution:**
R. Eastdown, Subiaco. (x2)
L.G. Booth, Alice Springs.

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**Comment:** Data in ppm unless otherwise stated.

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**This laboratory is registered by the National Association of Testing Authorities Australia. The tests reported herein have been performed in accordance with its terms of registration.**

**Registered Laboratory Number 1076**
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# Analytical Report

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**Client Order:** 20025

**Project:** 31 AUG 1982

**Sample Type:** Rock

**PE7398**

**Report Code:**

**Report Date:** August 29, 1982

**Report Comprises:** 8 data sheets

**Distribution:**

R. Eastdown, Subiaco. (x2)

L. G. Booth Alice Springs

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**COMMENT:** Data in ppm unless otherwise stated.

* Data in percentages.

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THIS LABORATORY IS REGISTERED BY THE NATIONAL ASSOCIATION OF TESTING AUTHORITIES AUSTRALIA. THE TESTS REPORTED HEREIN HAVE BEEN PERFORMED IN ACCORDANCE WITH ITS TERMS OF REGISTRATION.

REGISTERED LABORATORY NUMBER 1078

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**Report Code:** PE7393  
**Report Date:** August 29, 1982  
**Page:** 3 of 8  
**Package:** 3

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APPENDIX 2

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14th September, 1982

Mr. R. Easdown
Uranerz Australia Pty Ltd
245 Churchill Avenue
SUBIACO WA

Petrographic Report No. IL 16089
Sample Number 240A 0059

Order 20024
28th July, 1982
Submitted by L. G. Booth

J. E. Borner
PETROGRAPHIC DESCRIPTION

Sample No. 240A 0059 URANERZ  Registered No. IL 16089
Thin section

MEGASCOPIC CHARACTERISTICS

Field Name: Not given.
Nature of Sample: Small rock sample.
Minerals Visible: Quartz, feldspar, epidote, muscovite-sericite,
and opaques.
Texture: Mildly foliated (gneissic).
Colour: Grey with minor cream and buff.
Grain Size: Very fine to fine-grained.
Other Comments: This regionally metamorphosed quartzfeldspar
rock with gneissic fabric is seen under a binocular microscope
to be predominantly composed of interlocking oriented aggregates
of granoblastic quartz and feldspar, probably albite, and lepi-
doblastic muscovite. Minor oriented epidote could also be present
as lenticular aggregates.

MICROSCOPIC CHARACTERISTICS

Constituents: (Percent visual estimate)

40% Quartz occurs as very fine to fine foli-
ation oriented microcrystalline and macrocrystalline mosaic
textured aggregates with granoblastic fabric, that often exhibit
undulose extinction due to stress. The quartz is interlocked
with often finely sheared and granulated albite xenoblasts,
clusters, and lenticular aggregates, and oriented muscovite.
Relic quartz and feldspar clasts and volcaniclasts, Na-amphibole
and pyroxene, biotite, and chlorite, including the retrograde
variety, are absent.

34% Albite, occasionally untwinned and mottled,
and alkali feldspar occur as very fine, often sheared and granu-
lated, foliation oriented xenoblasts. The albite exhibits second-
ary deformation twinning with pericline twinning dominant, and
bending and wedging of twin lamellae. Exsolved albite spindles
are also present in the deformed plagioclase. Carlsbad twinning
is rarely seen. Very fine oriented quartz and muscovite filled
shears traverse the feldspars.

20% Muscovite-sericite occur as very fine
oriented flakes, and as lenticular and irregular lepidoblastic
aggregates of metamorphic, or K-metasomatic origin.

3% Epidote occurs as very fine to fine orient-
ed xenoblasts and subidioblasts, and lenticles dusted by Fe-oxides.

.../2
Sample No. 240A 0059 UTRANERZ
Thin section

3% Opaques occur as very fine granules and clusters of exotic goethite, and as often oriented anhedral to euhedral grains and clusters of indeterminate composition, possibly an oxide, or complex oxide opaque mineral. Relic sulphide textures are absent.

Texture: Mildly foliated (gneissic).
Alteration: Slight weathering.
Petrogenesis: A weakly weathered quartz-albite-microcline-muscovite-epidote gneiss (orthogneiss).

Remarks: Since there are no diagnostic relic clastic and/or volcanoclastic textures visible in this orthogneiss, it can be assumed that it represents a polymetamorphosed acidic igneous intrusive with granitic norm. Deformation twinning is common in the sheared albite xenoblasts. The epidote dusted by Fe-oxides could be of metasomatic origin. It is not a sheared, fenitized and albitized granite.

ROCK NAME: WEAKLY WEATHERED QUARTZ-ALBITE-MICROCLINE-MUSCOVITE-EPIDOTE GNEISS (ORTHOGNEISS).
1st September, 1982

Mr. R. Easdown
Uranerz Australia Pty Ltd
245 Churchill Avenue
SUBIACO WA

Petrographic Reports No. IL 16022 - IL 16025

Sample Numbers 240A 0055
240A 0065
240A 0068
240A 0072

Order 20024
28th July, 1982
Submitted by L. G. Booth

J. E. Borner
Sample No. 240A 0055 URANERZ

Thin section

MEGASCOPIC CHARACTERISTICS

Field Name: Not given.
Nature of Sample: Small hand specimen.
Minerals Visible: Quartz, feldspar, biotite, sericite, and opaques.
Colour: Grey with minor brown.
Grain Size: Very fine to fine-grained.
Other Comments: This weakly weathered and ferruginized quartzo-feldspathic igneous rock appears under a binocular microscope to be a soda granite. The essential albite grains appear to have been weakly sericitized. It is not a granite gneiss since foliation is poorly developed.

MICROSCOPIC CHARACTERISTICS

Constituents: (Percent visual estimate)

40% Albite occurs as very fine anhedral, tabular, and lath shaped grains and clusters of essential origin interlocked with subordinate quartz, minor biotite, and eudialite dusted by exotic Fe-oxides. The albite grains have been incipiently to weakly sericitized, possibly during K-metasomatic alteration, rather than metamorphic processes.

38% Quartz of essential origin occurs as very fine to fine scattered anhedral and clusters interlocked with albite and accessory biotite. Aegirine and riebeckite (Na pyroxene and amphibole) grains are absent. The quartz exhibits undulose extinction and some granulation due to the effects of stress.

20% Biotite occurs as very fine to fine, randomly oriented to suboriented flakes and clusters that often enclose very fine rutile crystals and crystalline clusters, and grains of the complex Zr silicate mineral, eudialite. It was not retrograde chloritized. Muscovite is absent.

1% Eudialite occurs as very fine to fine colourless anhedral to euhedral grains and clusters with high relief locked mainly in biotite, that occasionally exhibit reaction rims (coronas) due to alteration.

1% Opaques occur as very fine granules and clusters of exotic Fe-oxides, mainly goethite, and as indeterminate euhedra.
Sample No. 240A 0055 URANERZ
Thin section

Texture: Mildly foliated and hypidiomorphic granular.
Alteration: Slight weathering and ferruginization.
Petrogenesis: A weakly weathered, ferruginized and sericitized,
eudialite bearing soda granite.

Remarks: The presence of the complex R.E. bearing Zr silicate
mineral, eudialite, as grains and clusters suggests that this
Na granite could be petrogenetically related to an alkaline
ring complex. It is not a silicified and albitized syenite.
The weakly developed orientation of biotite flakes suggests
some regional metamorphic recrystallization.

ROCK NAME: WEAKLY WEATHERED, FERRUGINIZED & SERICITIZED,
EUDIALITE BEARING SODA GRANITE.