ARNHEM LAND MINING LIMITED

FOURTH ANNUAL REPORT ON

EXPLORATION CARRIED OUT ON

EXPLORATION LICENSE 1917 - MOUNT STOW

NORTHERN TERRITORY

For The Period

August 20, 1982, to December 1, 1982

E. R. Davies

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1. INTRODUCTION

Exploration License 1917 was granted to Arnhem Land Mining Ltd. on August 20, 1979, with annual renewals. The area of the tenement was progressively reduced from 299 km^2 to 72 km^2.

EL 1917 was acquired to explore for commercial uranium deposits associated with Lower and Middle Proterozoic formations.

Prior to February 1982, the exploration program was managed by Australia and New Zealand Exploration Company (ANZECO), an associate company of Arnhem Land Mining Limited, both being subsidiaries of Union Carbide Corporation.

The area was explored jointly with AAR Ltd., a subsidiary of CSR Ltd., and management was transferred to AAR in February 1982. In July, prior to the field season, AAR terminated their interest, and the management reverted to ANZECO. ANZECO commenced a field exploration program in September, but technical problems, as well as staff reductions in that month, led to the program being aborted.

The tenement was relinquished on December 1, 1982.

2. LOCATION AND ACCESS

EL 1917 is located approximately 70 km north-northeast of Katherine, NT (Fig. 1). It lies within the Mount Evelyn 1:250,000 map sheet.

Access is gained via an old logging track which joins the Edith Falls road, traverses the northern part of the Katherine Gorge National Park, and terminates within the tenement. An alternative route was pioneered into the area in 1980 from Eva Valley homestead to the southeast.

The tenement lies within Eva Valley pastoral lease, but no station tracks or fences exist.

3. TOPOGRAPHY

The tenement is located on a plateau forming the watershed between drainages to the South Alligator, Katherine, Fergusson and Mary Rivers. Drainage of very low gradient within the tenement is predominantly westwards to the Fergusson River.

The plateau surface is generally level, with alluviated swampy flats and rare remnants of an old lateritized surface.

4. PREVIOUS EXPLORATION

The area was mapped at a scale of 1" to 1 mile in the 1950's by the Bureau of Mineral Resources. The Northern Territory Geological Survey carried out mapping in the area in 1981. Previous regional mapping programs have relied to a large extent on air-photo interpretation of the plateau area.

There are no reports of previous company exploration over the subject area.

5. REGIONAL GEOLOGY

E.L. 1917 lies in the southern part of the main outcropping area of the Lower Proterozoic "Pine Creek Geosyncline" (Fig. 2). The "geosyncline" comprises shallow marine pelitic and chemical sediments with some volcanics which were regionally metamorphosed during orogenesis at about 1800 m.y., subsequently intruded by post-tectonic granites, eroded, and covered by Mid-Late-Proterozoic arenites and minor volcanics. Subsequent cover rocks include Lower Palaeozoic arenites and carbonates, and Mesozoic and younger arenites.

The Lower Proterozoic, and some Mid-Proterozoic rocks, show the regional structural strike to be NW-SE, the earlier rocks being highly deformed, the later (post-orogenic rocks) being deformed on open structures with the same trend. Strike-slip faulting is common.

E.L. 1917 lies on a structurally high block of Lower Proterozoic rocks flanked to the northeast and southwest by two synclinal troughs of Mid-Proterozoic volcanics and sediments. The higher parts of the area have a thin remnant cover of Mesozoic sandstone.

The synclinal trough northeast of E.L. 1917 (the Mount Callanan Basin) is a depositional basin in which 3,000 m. of Mid-Proterozoic rocks accumulated, including the Edith River Volcanics at the base, overlain by several pelite and thin volcanics units of the Kombolgie Sandstone. The Kombolgie Sandstone is unconformable on the lower units and extends regionally as an essentially horizontal unit over all rock formations.

The northeast margin of the Mount Callanan Basin coincides with the "South Alligator Hinge Line", a regionally striking structural zone of long-lasting significance in the tectonic and possibly depositional history of the region.

The South Alligator Valley Uranium Field occurs within the South Alligator Hinge Zone along the northeast border of the Mount Callanan Basin. Mineralization is predominantly associated with the Lower Proterozoic Koolpin Formation - a unit composed of finely bedded carbonaceous and ferruginous shales. The Koolpin Formation has been mapped on the opposite (southwest) flank of the Mount Callanan Basin, and is suspected to lie within the E.L. under cover of later rocks.

6. LOCAL GEOLOGY

6.1 Surface

Sandy soils cover most of the EL. Very few outcrops occur, and the geology of the area is poorly understood at present. The known outcrops are shown on Plate 1.

6.2 Lower Proterozoic

Basement thinly banded ferruginous and possibly carbonaceous shales crop out over a small area some hundreds of meters east of the original tenement boundary. They strike east-west, with a steep northerly dip. They have not yet been assigned to any formal group. Ferruginous and carbonaceous shales with an E-W strike also crop out in the central eastern area which was likewise outside EL 1917, being part of a tenement (EL 1959) held by AAR Ltd. These rocks were identified by CRA as being representatives of the Burrell Creek Formation (Scott 1972), with AAR assigning them to the Mt. Bonny Formation.

Within EL 1917 the only outcrops of basement shales occur in the central-west where mapping in late 1981 revealed two small rubbly subcrops of shale near the Fergusson River. Subsequently, a drill hole in the same area (DH 2) was sunk into sandy fissile siltstone.

6.3 Edith River Volcanics

Outcrops of Lower Mid-Proterozoic Edith River Volcanics were found in the west and south of EL 1917. The rocks are rhyolitic (Appx 1) with little evidence of bedding or foliation. Drilling intersected similar volcanics in holes Nos. DH 1, 6 and 7.

6.4 Kombolgie Formation

Mid-Proterozoic Kombolgie Formation sandstones had previously been mapped in the west of EL 1917 along the Fergusson River. The Formation probably underlies much of the northern part of the EL, and also occurs in the southeast and southwest. In the central-west of the area, it is seen to be in unconformable contact with the Lower Proterozoic rocks and the Edith River Volcanics. Measured dips on the Kombolgie Formation in the area indicate a north-northeasterly-trending anticline, breached by erosion to reveal a core of earlier rocks.

6.5 Cretaceous

A cover of Cretaceous sandstone had previously been assumed to extend over most of the EL. The actual extent of the cover has not been determined in the present survey, but it appears to be restricted to the central area of the EL. Low bluffs of white friable sandstone occur in this area, together with small pavement outcrops. These are distinguished from the Kombolgie Formation by color and degree of induration. They also contain a conglomeratic component. These "Cretaceous" sandstones are assigned to the Petrel Formation, and occur as a remnant thin cover. Drill hole DH 8 may have been collared in Cretaceous sandstone, but went into typical Kombolgie Formation at shallow depth.

6.6 Structure

The paucity and restriction of outcrop inhibits mapping and structural interpretation.

At a synoptic scale, Landsat satellite imagery illustrates the regional NW-SE basement trend outside the tenement. It also shows structural ENE-WSW trends in the basement, which can be projected through the tenement, and a NE-SW trend on the plateau.

The regional basement NW-SE trend has been disrupted in the tenement area, as is shown by E-W striking basement shales to the east, and, in places, to the west.

The principal structural feature within the EL is the afore-mentioned anticline in the central-west, showing Kombolgie Formation flanking a core of Edith River Volcanics and basement shales. A set of faults have tentatively been interpreted, probably at shear angles to the fold, but details of movement have not yet been determined.

7. SUMMARY OF ANZECO EXPLORATION 1979-81

1979 - A radon survey using "Alphameters" commenced in the northeast of the tenement. 770 readings were taken at 100 m intervals on lines 1 km apart. No significant anomalies were recorded. Magnetic and radiometric measurements were also taken at the same sites, with no readings of immediate interest. A trial resistivity line was surveyed by Murdoch Geophysics Australia Pty. Ltd., and indicated a thickening of cover to the west from known Lower Proterozoic outcrop in the east. The work was reported by Davies (1980).

1980 - The total EL was surveyed on a 100 x 1,000 m grid, consisting of 4,160 stations at which radon, radiometric and magnetic readings were taken. The radon method selected was a system of activated carbon adsorption developed by Union Carbide. A large area of elevated radon values was identified in the southwest of the tenement, coinciding with generally elevated radiometric readings. A resistivity survey of approximatelfy 46 km of profiling with several soundings was carried out by Murdoch Geophysics over the northern part of the EL, indicating cover rocks over "basement" ranging from 0-100 m. Several "basement" conductors were identified. The work was reported by Davies (1981).

1981 - The southwestern part of the tenement, together with two small areas in the north, were surveyed on a 200 m square grid by radon and radiometric methods. Several areas of radon anomalism were detailed, the principal area trending north-south with a size of about 2.5 km x 0.5 km. Poor outcrop conditions indicated the existence of a north-trending anticline cored by Edith River Volcanics and flanked by Kombolgie Formation. Rare outcrops of Lower Proterzoic shales occur near the

anticlinal axis. The mapping was supplemented by five percussion drill holes for bedrock identification. The radon anomalism occurs near and at the anticlinal axis. The work was reported by Cardno (1982).

8. EXPLORATION DURING THE FOURTH TENURE PERIOD

It was the intention, during the 1982 field season, to define the radon anomalies in more detail, as it was suspected that they may be due to leakage from depth along individual fractures. This would involve closing the grid interval to 50 or 25 meters or better. The detailed surface work would be supplemented by selective geophysics in the hope that drill targets could be identified for testing during the period. Due to the previously reported circumstances, this program was not implemented in full.

Field work commenced in September, when a radon emanometer was used to close the grid survey. The emanometer was chosen as all ANZECO radon equipment (alphameters and carbon equipment) had previously been transferred overseas.

Three lines were surveyed over the principal anomaly (lines N 57,000, N 57,100, and N 57,200) with readings at 50 m intervals. On the first pass, an anomaly was recognized at N 57,200, E 23,000. This value could not be repeated on subsequent tests at the same site, and there appeared to be problems with sampling and instrumentation. It was at that point that staff reductions led to termination of the program.

The locations and results of the emanometer survey are shown on Fig. 3 and Plate 2.

9. CONCLUSIONS

An anticlinal or domal basement "high" occurs within the tenement, and is spatially associated with linear radon anomalism. The radon is not supported by radiometric anomalism, and is probably derived from depth by leakage along fractures from an undetermined source.

E. R. Davies

ERD/gm

Attachments

REFERENCES

Bureau of Mineral Resources, 1979, Solid Geology of the Pine Creek Geosyncline (Map).

Cardno, G. W., 1982, Third Annual Report on Exploration Carried out on Exploration License 1917, Mount Stow, NT, A.A.R. Ltd. (unpublished).

Davies, E. R., 1980, First Annual Report on Exploration Carried out in E.L. 1917, Australia & New Zealand Exploration Co. (unpublished).

Davies, E. R., 1981, Second Annual Report on Exploration Carried out in EL 1917 - Mount Stow, NT, Australia & New Zealand Exploration Co. (unpublished).

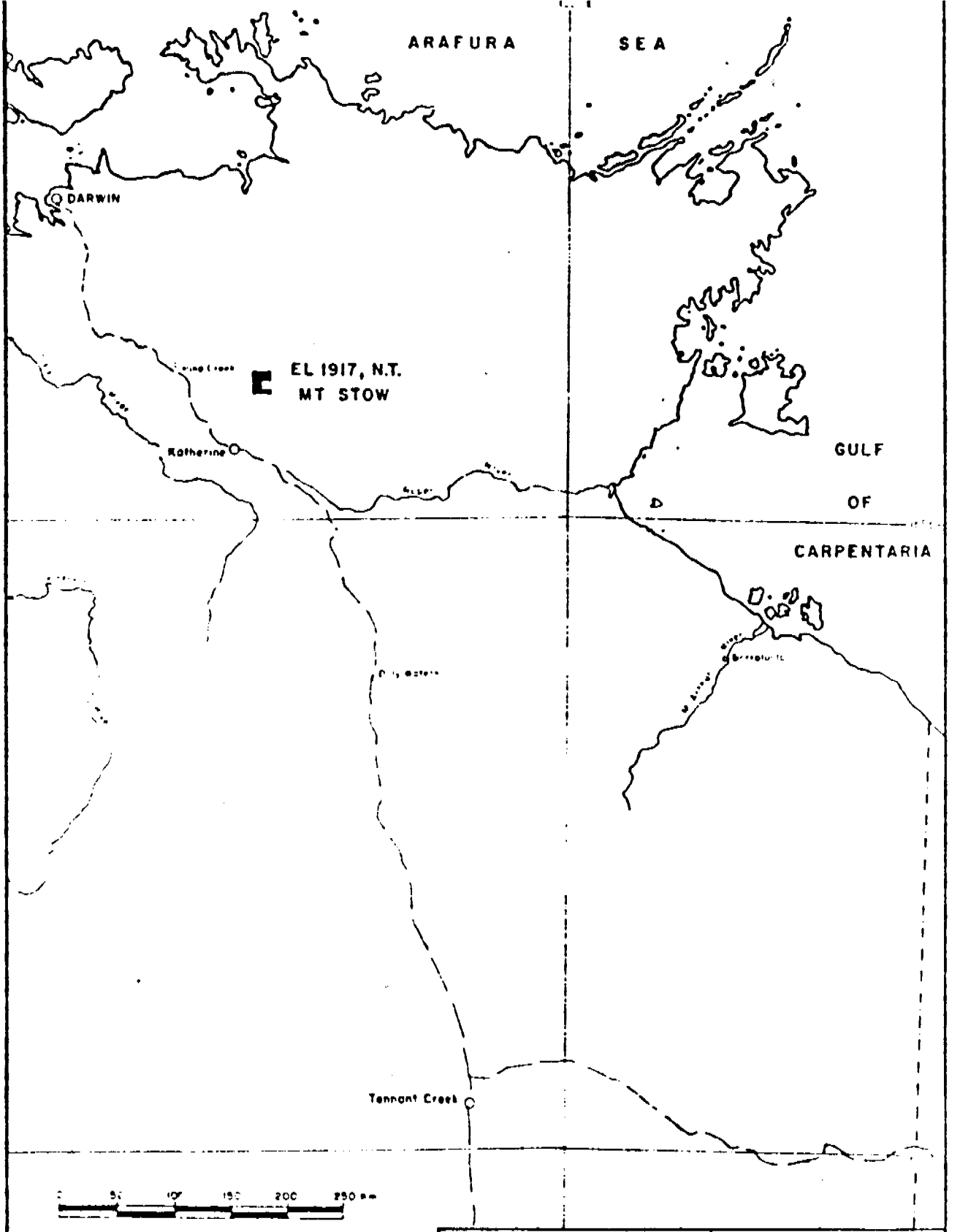
Scott, A. K., 1972, Final Report on P.A. 3240 - Mount Stow, NT, CRA Exploration Pty. Ltd. (unpublished).

Walpole, B. P., Crohn, P. W., Dunn, R. S. & Randall, M. A., 1968, Geology of the Katherine-Darwin Region, NT, Bur. Min. Resour., Bul. 82.

EXPENDITURE

For the Period August 20, 1982 to December 1, 1982

Salaries	5,514
Wages	450
Fringe Costs	209.70
Office Rent and Services	
Telephone	57.40
Postage and Freight	573.36
Publications	2.00
Maps and Reproductions	8.00
Supplies - Office	
Bank Charges/Accounting	859.00
Medical	
Equipment Maintenance	
Entertainment	42.00
Miscellaneous	15.45
Air Fares	1,896.40
Hotels and Food	1,027.47
Hire Cars and Taxis	91.24
Equipment - Non-Capital	59.00
Charter Aircraft	
Vehicle Expense	15.00
Property Payments	420.00
Contract Services - Geophysical	
Contract Services - Computer	
Camp Accommodation	238.09
Site Preparation, Roads	
Drilling - Rotary	
Equipment Mine	330.00
Sydney Overhead	585.00
TOTAL	12,393.11



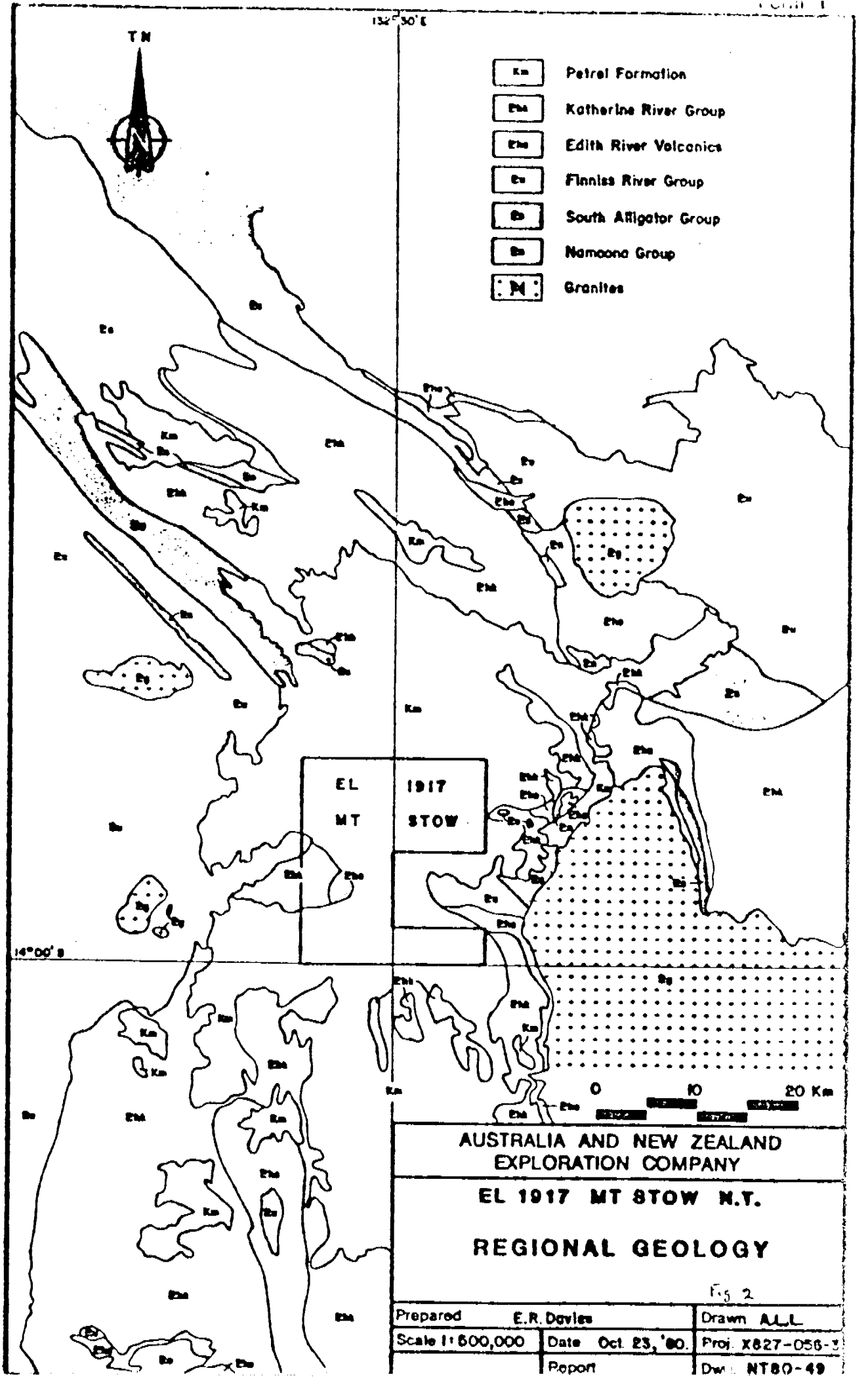
AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

EL 1917 MT STOW N.T.

LOCATION PLAN

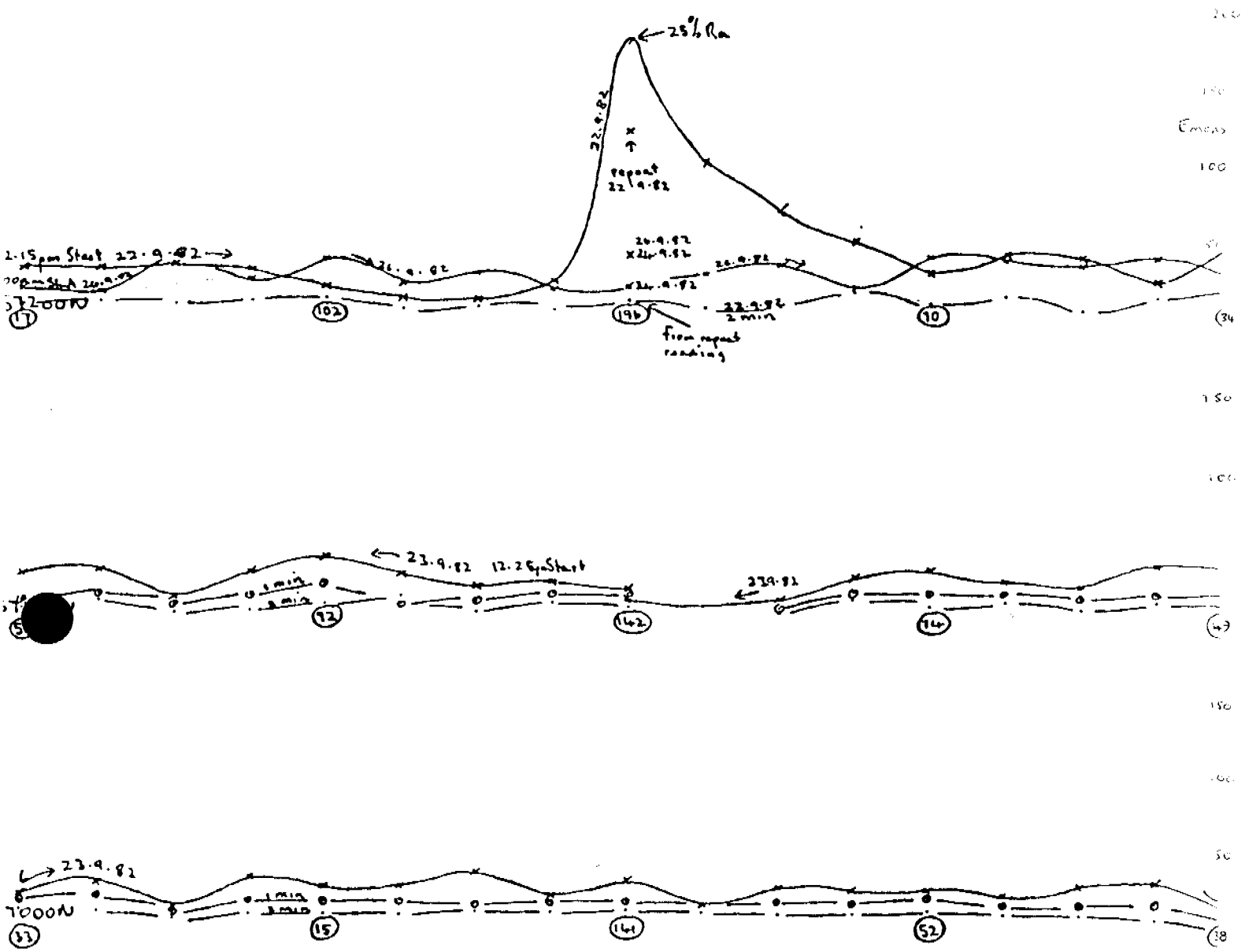
FIG 1

Prepared E.R. Davies		Drawn A.L.L.
Scale 1 : 5 million	Date Sept. 9, '81.	Proj X827-056-3
	Report	Dwg NT 81 - 25


TN
132°30'E
14°00'S
Petrel Formation
Katherine River Group
Edith River Volcanics
Finniss River Group
South Alligator Group
Namoona Group
Granites
EL 1917
MT STOW
0 10 20 Km
AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY
EL 1917 MT STOW N.T.
REGIONAL GEOLOGY
Fig 2
Prepared E.R. Davies
Drawn A.L.L.
Scale 1:600,000
Date Oct. 23, '80.
Proj. X827-056-3
Report
Dwg. NT80-49

EL 1917 Mt Stow Scintrex ETR1 Emanometer Traverses

Figure 3



Legend

(33) Carbon canister reading

Initial reading emanometer
reading after 1 minute
reading after 2 minutes

22700E
22800E
22900E
23000E
23100E
23200E
23300E

Original E.L. Boundary

7000N

6500N

6000N

5500N

Retained 1981

Retained 1982

Retained 1981

Retained 1982

Sand cover

Retained 1981

Original E.L. Boundary

2500E

3000E

3500E

DH1

DH2

DH6

DH7

DH8

Phk subcrop

Phe subcrop/outcrop

RIVER

Quaternary — Q — Alluvium

Cretaceous — K — Petrel Formation

Mid-Proterozoic — Phk — Komboigie Formation

Mid-Proterozoic — Phe — Edith River Volcanics

Lower Proterozoic — Pu — Burrel Creek Formation

CR 83/50

AUSTRALIA & NEW ZEALAND
EXPLORATION COMPANY

E.L.1917 MT.STOW

GEOLOGY

Scale 1:50000

PLATE 1

Relinquished 1981

Retained 1981

Relinquished 1981

Retained 1981

Technique -ANZECO Carcan

Contours -Residual CPM (background removed)

at 100,200,400,800 cpm

Grid base AMG

CR 83/50

AUSTRALIA AND NEW ZEALAND EXPLORATION COMPANY

E.L. 1917 MOUNT STOW

RADON SURVEY

Scale 1:50000

PLATE 2

EL 1917

APPENDIX I

PETROLOGICAL REPORT

CENTRAL MINERALOGICAL SERVICES

Date 27th April, 1981

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
3154
Argillised, Intrusive Porphyritic Rhyolite

Job No. CMS 81/3/62 Date Received: 31.3.1981

Reference SDO No. 00476

Sample No. 3154

Nature of Sample: Hand Specimen

DESCRIPTION SECTION No. 36616

a. Hand Specimen:

Pale brown porphyritic rock. K-feldspar stain test negative. Very weakly radioactive. No fluorescence.

b. Microscopic:

This is an argillised porphyritic rhyolite, with an intrusive fabric; the term rhyolite is used in a broad sense, since the feldsparscritical for classification are no longer re-cognisable. The source of the radioactivity was not identified in thin-section, and would require more elaborate techniques; it is presumed to be related to the argillic alteration.

The rock consists of corroded quartz phenocrysts, and feldspars pseudomorphed by aggregates of illite-hydromuscovite and intergrown goethite. The groundmass shows typical felsitic textures and is medium-grained, uniform and featureless; it now consists of quartz with intergrown fine, random sericite flakes. Flow-banding and related features are absent.

The alteration can be regarded as a low-grade hydrothermal phenomenon, not simply due to weathering; U/Th may be associated with the introduced goethite.

H.W. Fander, M. Sc.