C.R.A. EXPLORATION PTY LIMITED

EL 1239 BROWN'S WEST, N.T.

ANNUAL REPORT

PERIOD ENDING 5/5/1980

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Copy to: N.T. Dept. of Mines & Energy

Report No. 10099

CONTENTS

1. SUMMARY

During the third year of tenure exploration focussed on the shale/dolomite contact south of Brown's. A spectral I.P. survey in this area gave confusing results and a full interpretation report from the contractor is still awaited. Ground magnetometry over the same survey lines delineated a magnetic horizon, possibly containing pyrrhotite, but drill testing of this horizon awaits the spectral I.P. interpretation.

2. INTRODUCTION

Title to Brown's West EL 1239 of 11.57 square miles was granted on 6.5.1977. The objective was to assess the area for possible extensions to the Brown's lead-zinc mineralisation to the south and west of the CRA held Brown's leases.

The first year's exploration programme, described by Fraser and Muggeridge (1978), largely consisted of a bedrock soil auger geochemical sampling survey, designed to cover the western extremity of the Brown's mineralisation and favourable black shale lithologies, and follow-up diamond drilling. In the second year's exploration, reported by Wills (1979a), emphasis moved away from Brown's to a programme of testing for blind mineralisation based upon the Rum Jungle periodicity theory. One diamond drill hole was drilled, but apart from confirming the expected sequence of amphibolite, graphitic shale and dolomite, results were negative and the periodicity theory apparently discounted.

As required, on 5.5.1979 the EL area was reduced by 50% to 5.14 square miles, the ground between the Brown's and Area 55 leases being retained (see Plan NTd 1014). Since Wills (1979a) concluded that the area with greatest potential for a blind orebody is the dolomite/shale contact zone south of Brown's, the third year's exploration programme concentrated in that area. This report describes exploration during the third year of tenure to 5/5/1980.

3. CONCLUSIONS

Potential for blind mineralisation of economic significance may still exist in the black shales of the embayment syncline south of Brown's. The final interpretation report on the spectral I.P. data should assist the assessment of this potential, and necessitate follow-up drilling.

4. GEOLOGY

The geology of the EL are is shown in Plan NTd 1450. This map is derived from the work of Wills (1979b) who compiled a new solid geological map of the Rum Jungle area from the following sources:-

(1) Miezitis (1967) Rum Jungle Compilation
(2) Johnson (1974) and his 1:100 000 Rum Jungle sheet
(3) Various T.E.P. maps
(4) CRAE 1975-76 regional mapping

Also taken into account was the revised stratigraphy of the Pine Creek Geosyncline based on recent mapping by CRAE (Wills, 1976) and the BMR (Needham and others, 1979).

Earlier maps of the Rum Jungle area showed the following broad stratigraphy:-

Age	Unit		Lithology
Lower Proterozoic	Burrell Creek Formation	-	turbidites
	Golden Dyke Formation	-	various argillites
	Batchelor Group	-	rudites and dolomites
Archaean	Basement	-	granite and granite gneiss

Present information suggests that the Golden Dyke Formation (now part of the BMR's South Alligator Group in the centre of the Pine Creek Geosyncline) does not outcrop at all in the Rum Jungle area. Regionally, Golden Dyke Formation (South Alligator Group) rocks are quite distinctive and are exposed as ironstones and shales with concentrations of chert nodules (Koolpin Formation) and white-coated black flinty shales (Gerowie Tuff). Neither of these characteristic lithologies are known from exposures or drilling in the Rum Jungle area.

Batchelor Group and Finniss River Group rocks in the Rum Jungle area are well defined. Problems arise over the stratigraphic position of the dominantly argillite sequence between these two groups. Wills (1979b) proposed a three-fold subdivision of this sequence which correlates with the Mt. Partridge and Namoona Groups from the central part of the geosyncline:-

Mt. Partridge -	(Wildman Siltstone	-	siltstone, pyritic shale, fine greywacke, sandstone
	(Acacia Gap (Sandstone	-	pyritic carbonaceous quartz sandstone, grit and shale
Namoona -	Masson Formation	-	pyritic dolomitic shales, minor sandstone

These lithologies fit in well with the suggested disposition of formations in the Rum Jungle area. The quartzite ridge trending NW in the EL area is identical to the Acacia Gap Sandstone in its type area and unconformably overlies pyritic black shale and amphibolite north of Mt Burton, a relationship identical to the unconformity at the base of the Mundogie Sandstone. The strata overlying the quartzite consist of black shales, sericitic shales, amphibolites and greywackes, and are probable equivalents of the Wildman Siltstone. Strata underlying the quartzite dominantly consist of graphitic dolomitic shale with amphibole-chlorite rocks and minor quartzite, an assemblage similar to that of the Masson Formation in the Namoona area. At Rum Jungle however this argillite sequence is different being much thinner and containing the amphibole-chlorite rocks.

5. GROUND GEOPHYSICS

With the failure of drill hole DD78BD65 to intersect economic mineralisation midway between Brown's and Area 55, attention focussed on the shale/dolomite contact zone south of Brown's. To assess this zone for the presence of sulphides several lines of spectral I.P. were extended southwards from across the Brown's mineralisation. NTd 1353 shows the location of these spectral I.P. lines.

The system employed was developed by Phoenix Geophysics of Toronto, Canada, but the survey was carried out by the Australian geophysical contractor Geoex of Adelaide using Phoenix's equipment.

Spectral I.P. is a relatively new geophysical technique. Because of characteristic response curves for different rocks and minerals (e.g. pyrite, chalcopyrite, galena, sphalerite, graphitic shale, etc) in the laboratory, it is claimed that by "depth sounding" in the field the presence and identification of sulphides below surface may be determined. The technique involves the measurement of resistivities produced in the ground by electrical signals of different frequencies. Two dipoles are used - a current or transmitting loop and a receiving loop. Induction depends on the rock below the surface and the distance between the dipoles. With the spectral I.P. technique the coupling influence curve is removed, leaving just the peaks which can then be compared to the laboratory curves. Results are plotted on pseudo-sections.

During the survey at Brown's 50 metre diameter dipoles were used with a 50 metre spacing interval adopted. Readings were recorded over the range of frequencies from 0.01 to 80Hz in multiples of 3^x for each dipole spacing from n=1 (50 metres) to n=6 (300 metres) along each survey line.

The results from the survey were confusing with no clear cut interpretation readily available. A full report is still awaited from Phoenix Geophysics who are working on the data to resolve it.

During the spectral I.P. survey ground magnetometer readings were taken with a Scintrex MP-2 proton instrument along the same survey lines (see Plan NTd 1353) for later comparison with the spectral I.P. results. The resultant profiles are plotted on Plan NTd 1436. The depicted magnetic response has been tentatively interpreted as a dipping body of pyrrhotite within the Masson Formation black shales, but until the spectral I.P. results have also been interpreted no drilling is planned to test this magnetic body.

6. Co STUDY

As part of a study of the Co mineralisation in the Brown's Intermediate and White's Prospects, selected intervals of pulverised half core from DD78D65 were resubmitted for Co assay. Results were not encouraging and are listed in the Appendix.

A.A. SNELLING

REFERENCES

Fraser, W.J. Muggeridge, G.D.	1978	Brown's West EL 1239, N.T. Annual Report to N.T. Mines Branch. CRAE Report 9156.
Johnson, K.	1974	Progress Report: Geological Review and Revision of the Rum Jungle Area, N.T. BMR Record 1974/41.
Miezitis, Y.	1967	Rum Jungle Compilation. BMR Record 1967/150.
Needham, R.S. Crick, I.H. Stuart-Smith, P.G.	1979	Regional Geology of the Pine Geosyncline. I.U.S. on the Pine Creek Geosyncline, Ext.Abs., pp 134-138.
Wills, K.J.A.	1976	Regional Mapping of the Pine Creek Basin, Preliminary Report. CRAE Report 8709.
Wills, K.J.A.	1979a	Annual Report for the year ending 5.5.79, Brown's West EL 1239, Rum Jungle, N.T. CRAE Report 9532.
Wills, K.J.A.	1979b	A Review of Rum Jungle Stratigraphy and Mineralisation with Proposals for Further Exploration. CRAE Report 9714.

KEYWORDS

Brown's, Rum Jungle, SD 52-8, geology-detailed, Proterozoic-Lr, shale/dolomite, geophys - I.P., geophys-mag., cobalt.

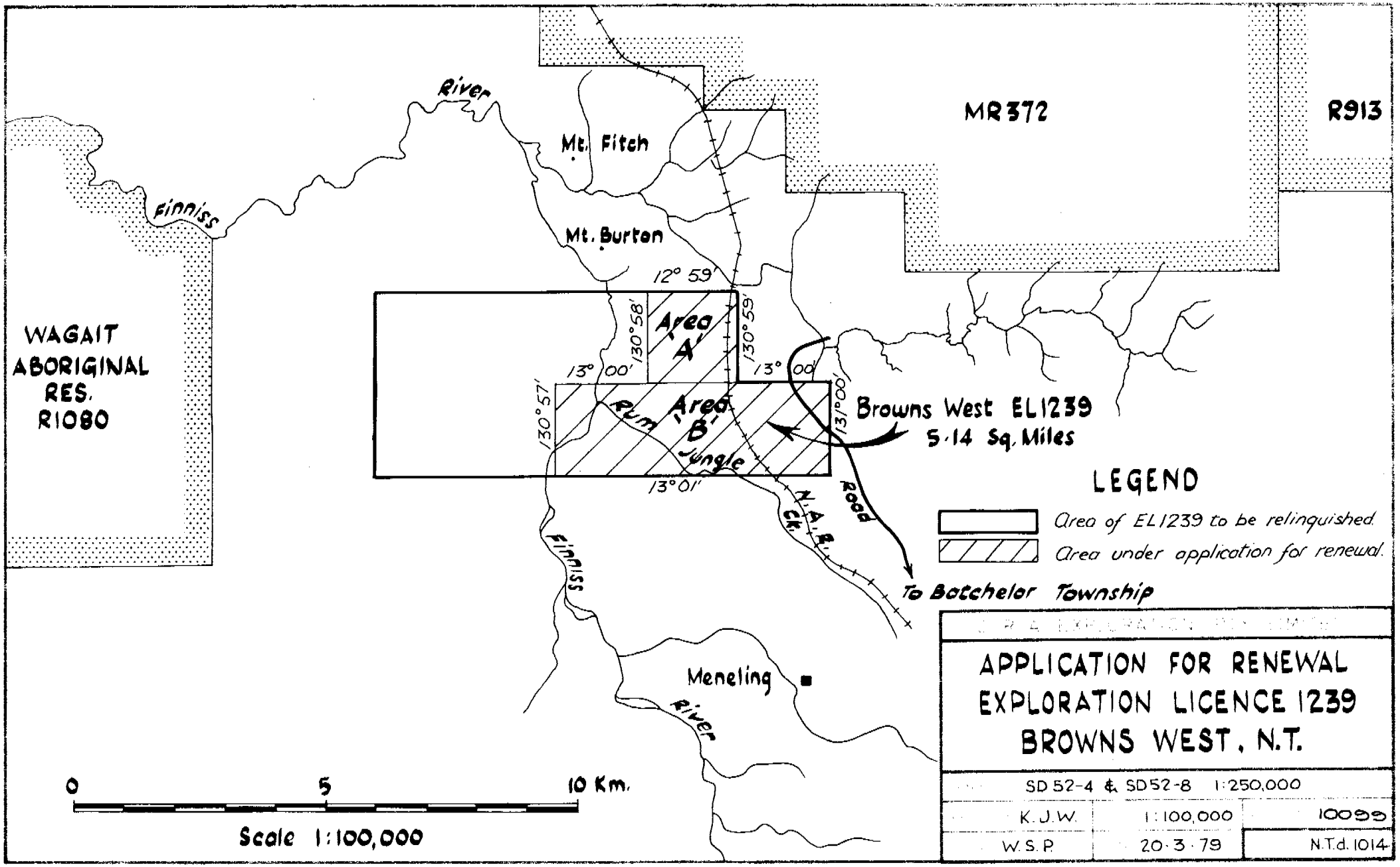
LOCATION

Pine Creek	SD 52-8	1: 250 000 map sheet

LIST OF PLANS

Plan No.	TITLE	SCALE
NTd 1014	Application for Renewal Exploration Licence 1239 Brown's West, N.T.	1:100 000
NTd 1450	EL 1239 Brown's West, N.T. Solid Geology Map (after Wills, 1979).	1: 20 000

Plan No.	TITLE	SCALE
NTd 1353	Location of Spectral I.P. Lines, Brown's and Intermediate Leases.	1: 4 800
NTd 1436	Brown's Ground Magnetometer Profiles along Spectral I.P. Lines.	as shown


MR372
R913
Mt. Fitch
Mt. Burton
River
Finniss
WAGAIT ABORIGINAL RES. R1080
12° 59'
130° 58'
130° 59'
13° 00'
13° 00'
130° 57'
13° 01'
Area A'
Area B'
Rum Jungle
Browns West EL1239
5·14 Sq. Miles
LEGEND
Area of EL1239 to be relinquished.
Area under application for renewal.
To Batchelor Township
N.A.R. Ck.
Road
Finniss
Meneling
River
0
5
10 Km.
Scale 1:100,000
APPLICATION FOR RENEWAL
EXPLORATION LICENCE 1239
BROWNS WEST, N.T.
SD 52-4 & SD52-8 1:250,000
K.J.W.
1:100,000
10099
W.S.P.
20·3·79
N.T.d. 1014

LEGEND

ADELAIDEAN - TOLMER GROUP

Puo	46	Depot Creek Sandstone

LOWER PROTEROZOIC

Plo	85	Zamu Dolerite

FINNISS RIVER GROUP

Plfb	69	Burrell Creek Formation

WILDMAN SILTSTONE

Plpw - ser s	57	sericitic shale/slate/schist
Plpw - b s	56	black carbonaceous shale/slate/schist
Plpw - cal bt s	64	calcareous biotite shale/slate/schist
Plpw - gw	71	fine greywacke
Plpw - am	50	para-amphibolite
Plpw - chl s	43	chloritic shale/slate/schist

ACACIA GAP SANDSTONE

Plpa - py qte, b s	6	pyritic quartzite interbedded with minor black shale

MASSON FORMATION

Plnm - b s	53	black carbonaceous and or graphitic shale/slate/schist
Plnm - chl s	52	chloritic shale/slate/schist, green mudstone
Plnm - am	51	para amphibolite - tremolite - actinolite - carbonate rocks
Plnm - b s, py qte	55	black shale interbedded with minor pyritic quartzite
Plnm - tc grn s	48	talcose greenshale/slate/schist
Plnm - ser s	58	sericitic shale/slate/schist
Plnm - trem qte	41	tremolitic quartzite (possibly part of Plbc)
Plnm - cal bt s	65	calcareous biotite schist

BATCHELOR GROUP

Plbc	88	Coomalie Dolomite
Plbr	86	Crater Formation

RUM JUNGLE COMPLEX

Arg 3	14	leucocratic granite
Arg 1	13	coarse to medium granite

SYMBOLS

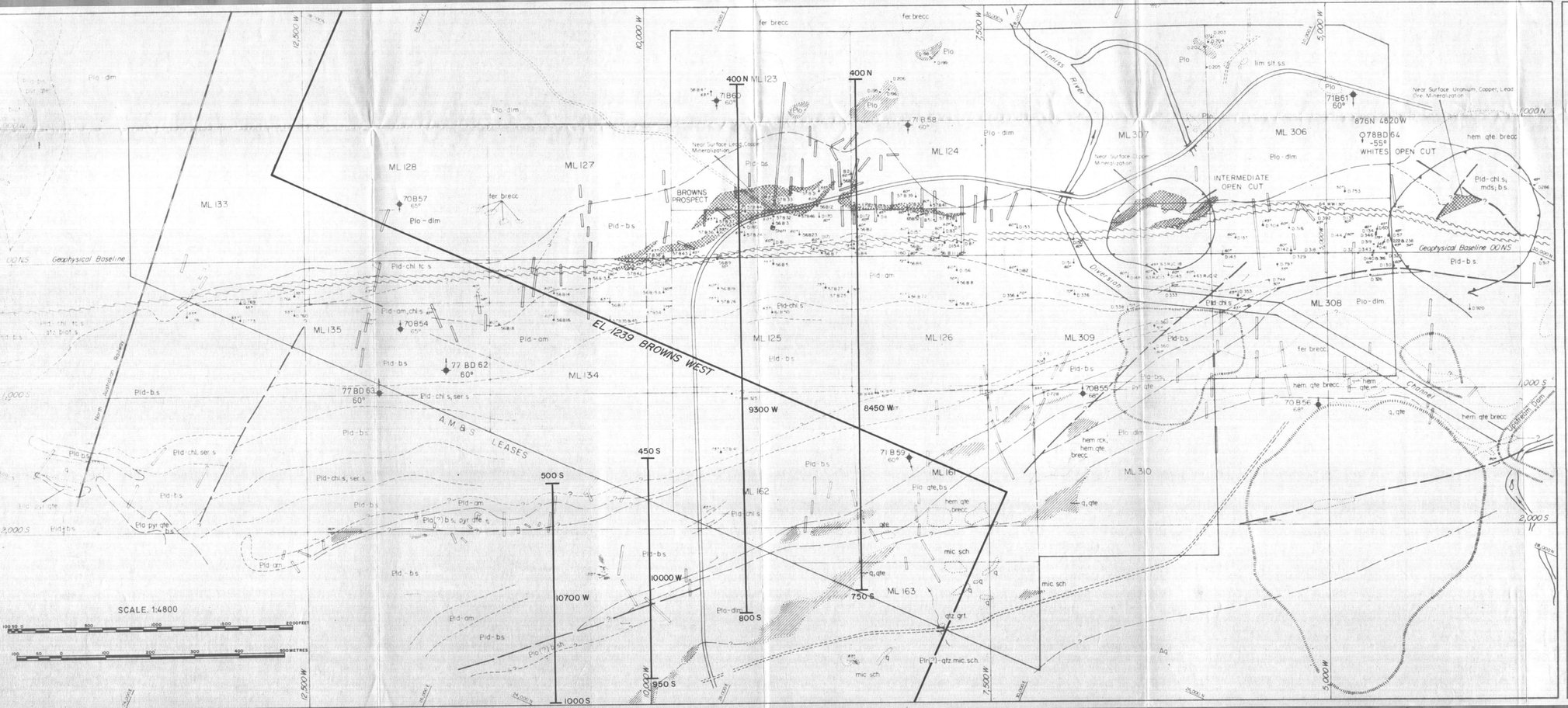
DIAGRAM REFERENCE		
		bitumen roads
		main tracks
		creek
		railway
		boundary of open cut mine
	11	surface projection of mineralisation
		faults
		shear zones
	4	quartz veins
	45°	strike and dip of bedding
		synclinal axis with plunge

LOCATION DIAGRAM

SCALE 1:20,000

200 0 200 400 600 800 1000 1200 1400 1600 m

C R.A. EXPLORATION PTY LIMITED		
EL 1239 BROWNS WEST N.T. SOLID GEOLOGY MAP (after Wills, 1979)		
Reference SD 52-8		
Geologist A.A.S.	Scale 1:20,000	Report No 10059
Drawn S.P.S.	Date JULY 1980	Plan No NTd 1450



LEGEND

(Surface Geology After Y. Miezitis B.M.R. '69)

fer brecc - ferruginous breccia, mostly pisolitic (laterite)

hem qte brecc. - hematitic quartzite breccia

hem rck - hematitic rock, iron oxides, mainly hematitic

qte - quartzite / quartzite breccia

lim slt ss. - limonitic siltstone and sandstone

? TERTIARY

? LOWER PROTEROZOIC

LOWER PROTEROZOIC

ARCHAEAN

GOLDEN DYKE FORMATION

Pld — b.s - black carbonaceous and/or graphitic slate, schist; chl.s - chloritic slate, schist; ser.s - sericitic schist, slate; tc.s - talcose schist; mds - mudstone, am - amphibolite

MASSON FORMATION

Plo — b.s - black carbonaceous and/or graphitic slate; pyr qte - pyritic quartzite; ser.s - sericitic slate

COOMALIE DOLOMITE

Plo — dim - dolomite, b.sh - black shale; Undifferentiated dolomite, tremolitic dolomite, quartzite

CRATER FORMATION

Plr — qtz mic sch - quartz mica schist, mic sch - mica schist, qtz grt - quartz grit

RUM JUNGLE COMPLEX

Ag — Undifferentiated granite, gneiss

- Q78BD64 — Proposed Diamond Drill Hole
- 71859 — A.M.B.S. Diamond Drill Hole Drilled Post-1970
- T.E.P Diamond Drill Hole
- Formation Boundary
- Lithological Boundary
- Outcrop and Rubble Boundary
- Fault
- Shear Zone
- Mapped Outcrop and Rock Exposure
- Open Cut Perimeter
- Overburden Dump Perimeter
- Bulldozed Costean
- A.M.B.S. Diamond Drill Hole Pre 1970 Showing Direction and Dip
- q, qte — Vein Quartz and Quartzite
- Strike and Dip of Bedding
- Strike and Dip of Cleavage, Schistosity
- Strike of Vertical Cleavage, Schistosity
- Lineation on Cleavage
- Minor Anticline
- Vehicle Track
- Mineral Lease Boundary
- 26,000 N — T.E.P Mine Grid
- **Spectral I.P line**

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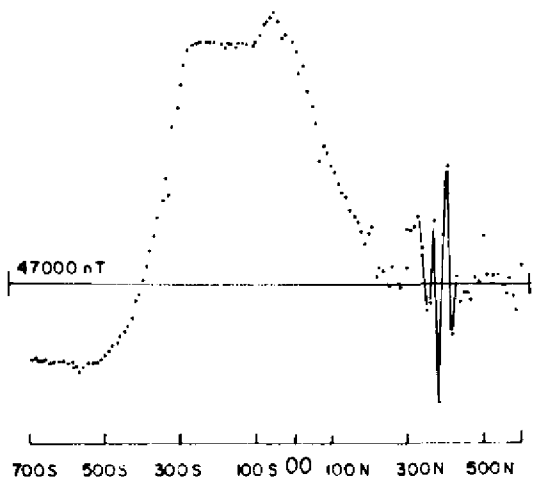
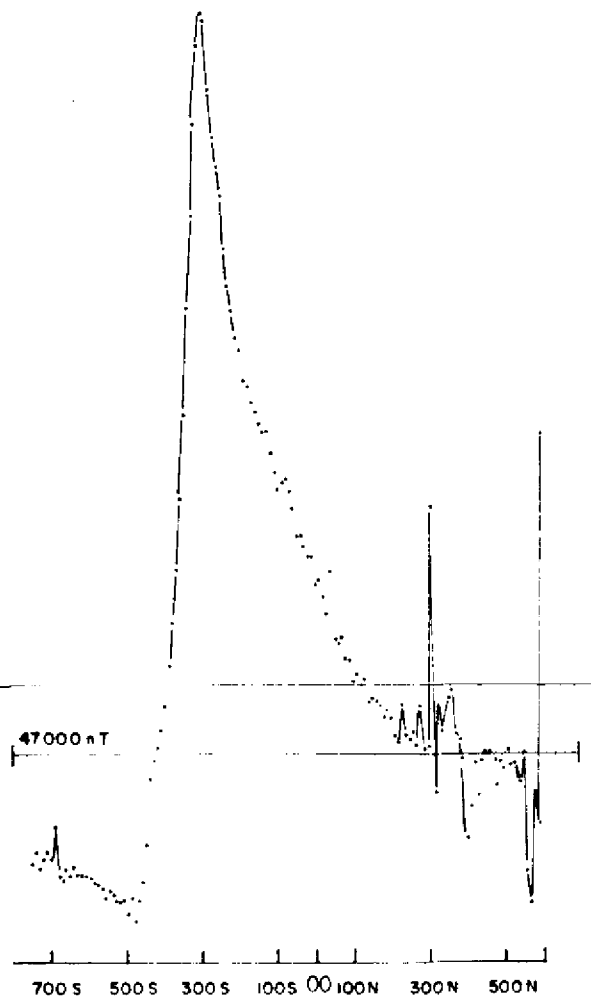
LOCATION OF SPECTRAL I.P. LINES BROWNS & INTERMEDIATE LEASES RUM JUNGLE, NORTHERN TERRITORY.

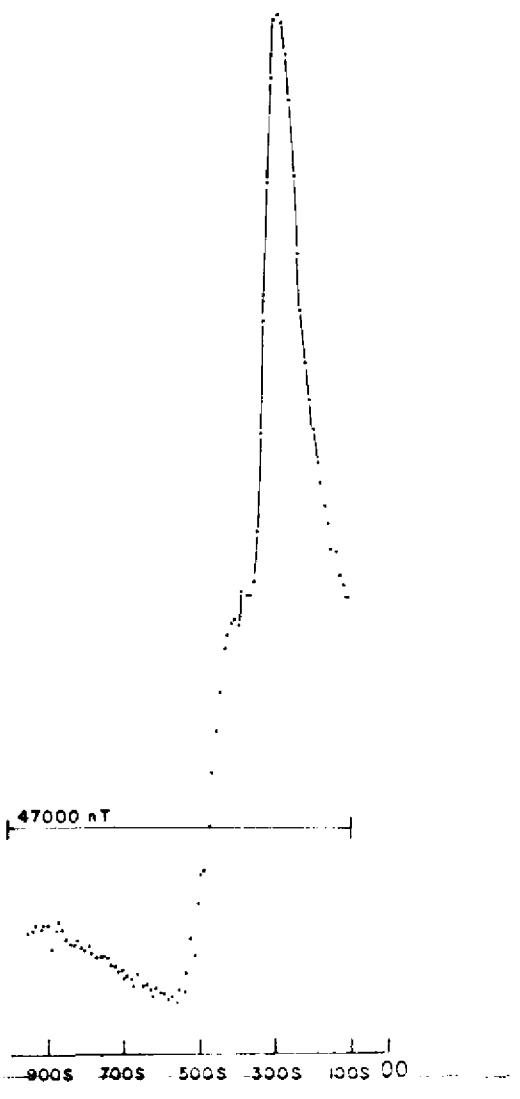
GEOLOGIST G.H.S.	SCALE 1:4800	DRAWN F.M.C. S.P.S.
REPORT No. 10099	DATE March 1980	PLAN No. NTd 1313



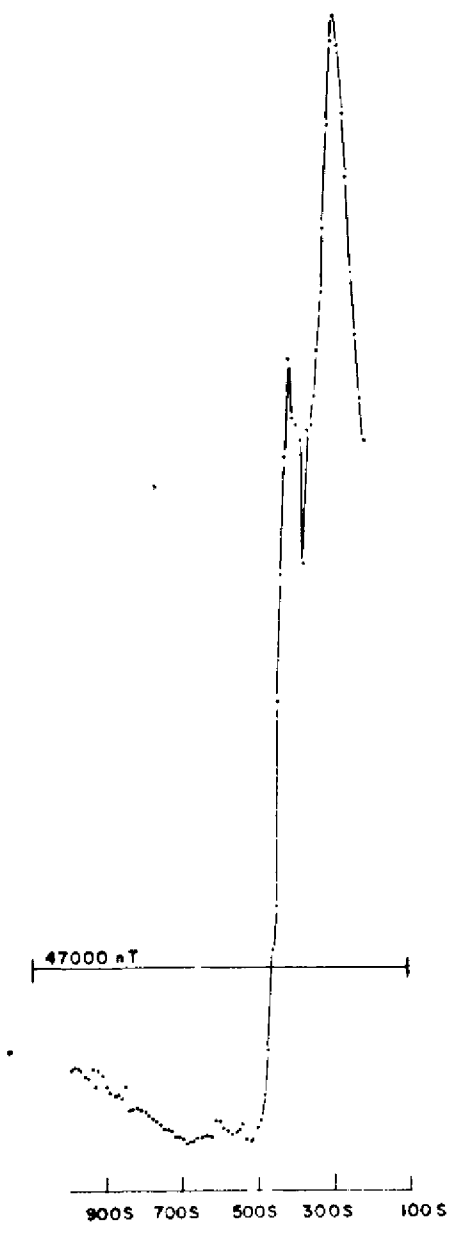
8400 m W



9300 m W



10,000 m W



10,700 m W

NOTES

1. FOR GEOLOGY AND LOCATION OF LINES SEE PLAN No. NTd 1353
2. NO DIURNAL DRIFT CORRECTION MADE ON 10,000 W
3. DIURNAL DRIFT CORRECTIONS APPLIED TO 8400 W, 9300 W, 10,700 W BUT RELATIVE LEVELS BETWEEN PROFILES ARE ARBITRARY

C.R.A. EXPLORATION PTY LIMITED

BROWNS
GROUND MAGNETOMETER PROFILES ALONG SPECTRAL IP LINES

Reference SD 52 - 4 & 8		
Geologist G.H.S	Scale as shown	Report No 10099
Drawn S.P.S.	Date May 1980	Plan No. NTd 1436

1980 Reassaying for Co

DD78BD65

Brown's West EL 1239

DD78BD65 Cobalt Assay Results (1980)

Sample No.	Sample Interval	Co (ppm)
767440	78m - 79m	43
767441	79m - 80m	47
767442	80m - 81m	27
767443	81m - 82m	21
767444	82m - 83m	20
767445	83m - 84m	55
767446	84m - 85m	25
767447	85m - 86m	15
767476	142m - 143m	13
767477	143m - 144m	12
767478	144m - 145m	23
767479	145m - 146m	40
767480	146m - 147m	27
767481	147m - 148m	10
767489	162m - 163m	15
767490	163m - 164m	20
767491	164m - 165m	16
767492	165m - 166m	13
767493	166m - 167m	24
767494	167m - 168m	14
767495	168m - 169m	14
767496	169m - 170m	15
767497	170m - 171m	15
767498	171m - 172m	12
767499	172m - 173m	15
767500	173m - 174m	15
767501	174m - 175m	23
767502	175m - 176m	28
767503	176m - 177m	45
767504	177m - 178m	18
767505	178m - 179m	20
767506	179m - 180m	18