CRA EXPLORATION PTY LTD

OPEN FILE

ATULA BORE EL 4018

ARUNTA BLOCK

FINAL REPORT

OCTOBER, 1983

submitted by:	B.E. Harvey
accepted by:	W.H. Johnston
date:	October, 1983
copies to:	CRA Exploration Pty Ltd - Canberra N.T. Dept of Mines & Energy

Map reference
Illogwa Creek SF53-15
Brahma: 6051

Confidential Report No.13039

CONTENTS

1. SUMMARY

CRA Exploration Pty Limited (CRAE) carried out ground magnetometer follow up on selected aeromagnetic dipolar responses within EL 4018, Atula Bore. No indications of kimberlite were apparent in the field and regional reconnaissance suggest alpine-type ultramafics are the causative bodies for dipolar magnetic responses. No further work is planned.

2. INTRODUCTION

EL 4018, Atula Bore, was granted to CRAE on 13 December, 1982. During 1982 the N.T. Department of Mines and Energy released data from a low level airborne magnetic and radiometric survey which concluded the Atula Bore area. This report presents results from ground magnetometer recovery of selected aeromagnetic responses.

3. CONCLUSIONS

Magnetic responses identified by ground magnetometer traversing are not due to kimberlite. The magnetic responses are probably due to magnetic contrast in metamorphic rock types and, regionally, a suite of alpine-type ultramafics.

5. FOLLOW UP ON AIRMAGNETIC FEATURES

5.1. During 1982, the N.T. Department of Mines and Energy released data from a low level airborne magnetic and radiometric survey which included the Atula Bore area. North-south traverse lines were flown at 500m spacing with 100m mean terrain clearance; nominal sample interval 55m at 1.0 second intervals.

Survey data, as released by the Department of Mines and Energy, comprised contour plots at 1:100 000 and 1:250 000 scale for Magnetics and Total Count Radiometrics. Preliminery review of the data showed them to be inadequate for detailed analysis and consequently multiplots were obtained.

Initial review of data showed prominent NW-SE trending lineaments in magnetic basement which were interpreted as responses to structural features in the earths crust. A number of dipolar magnetic features associated with these lineaments were selected for further investigation by ground magnetometer traverses.

Radiometric data was reviewed by comparing K, Th and U-channel profiles in multiplots. No anomalies were found to have significant U-channel contribution to total count.

5.2. Magnetic Feature IC6

See Appendix III for Ground Magnetic Profile.

The area comprised shallow alluvium (2-5m) between subcropping quartz-veined biotite schists. An area of cover approximately 100 x 100m corresponded exactly to the magnetic feature. Magnetometer profile suggests a small intrusive body. Drainage/loam sample 970044 was collected from swail drainage in the depression and reported 1 x +0.5 chromite and negative for microdiamonds.

5.3. Magnetic Feature IC7

See Appendix III for Ground Magnetic Profile.

Shallow alluvium (2-5m) covered the area of magnetic response; quartzitic gneiss cropped out closeby. Magnetic profile suggests varying metamorphic lithologies as source for magnetic contrast.

5.4. Magnetic Feature IC8

See Appendix III for Ground Magnetic Profile.

The area of magnetic response was covered by moderate depth alluvium (10-20m) and no outcrop occurred closeby. Magnetic profile suggests an intrusive body at moderate depth. Loam sample 970324 was collected from a deflation surface in the area and reported 6 x +0.5 chromites and 21 x +0.4 chromites.

5.5. Magnetic Feature IC9

See Appendix III for Ground Magnetic Profile.

Magnetic Feature IC9 corresponds to the southern end of a belt of intermittently outcropping altered ultramafic rock. Outcrop comprised ferruginised and silicified haematite with network-veined and botryoidal textures. Chrysoprase was apparent in secondary veins. Rockchip sample 970319 returned anomalous assays for nickel, cobalt and chromium at 2500 ppm, 1250 ppm and 3100 ppm respectively. No anomalous assays for gold, platinum, palladium or niobium were returned.

The belt of similar outcrops extends on a bearing 330° and appears to be a concordant horizon in the metasedimentary sequence.

5.6. Magnetic Feature IC12

The area comprised a small valley of swampy drainage between outcropping quartz veined felsic schists. Ground magnetometer profile is ambiguous, but could be the response to an intrusive body at shallow depth.

5.7. Magnetic Feature IC18

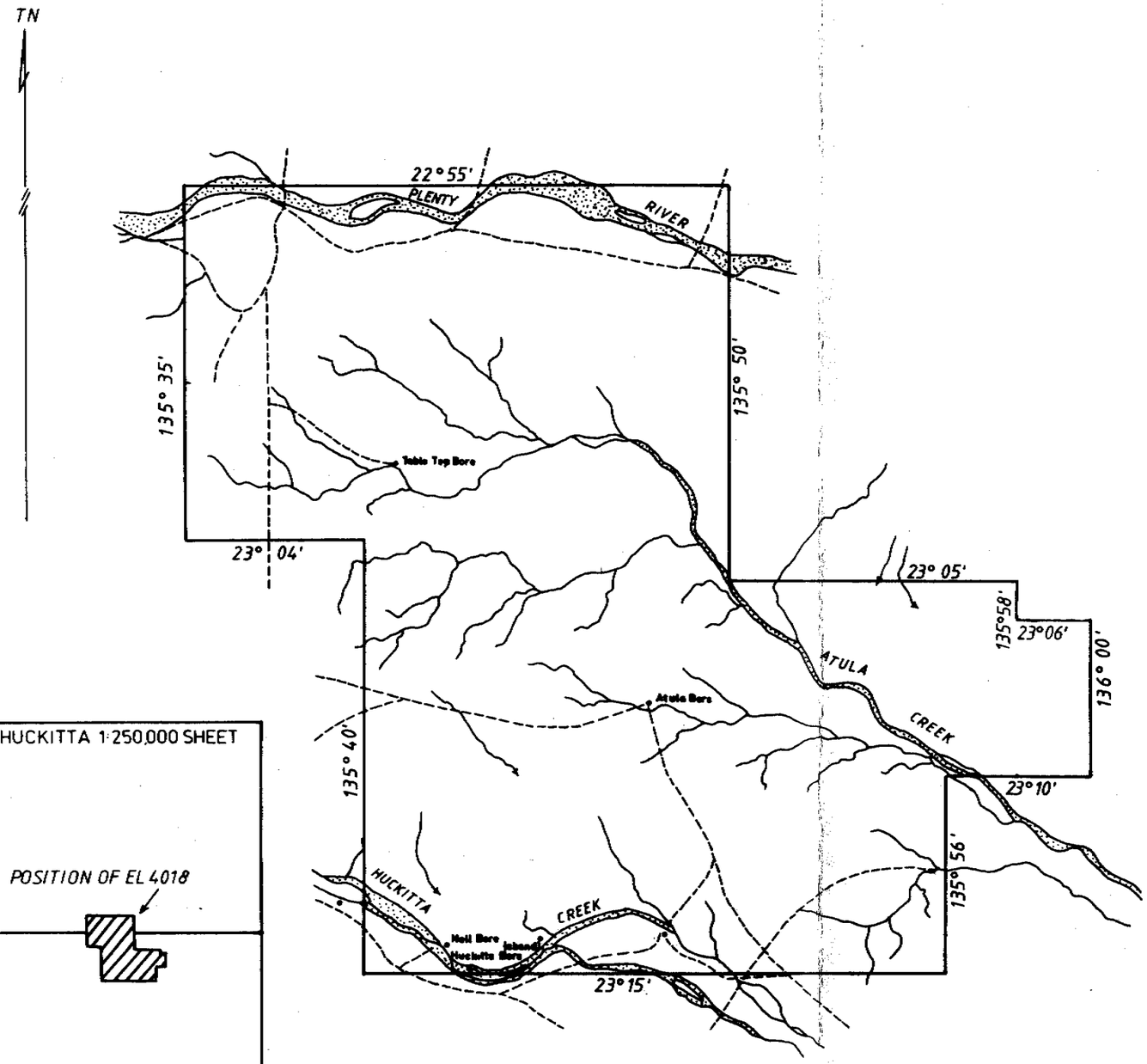
Magnetic feature IC18 occurs in an area of deep alluvium adjacent to Huckitta Creek. Ground magnetometer profile suggests a magnetic intrusive at moderate depth.

5.8. Outcropping Ultramafic Rocks

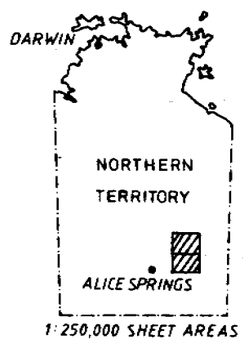
A number of ultramafic rocks were found to outcrop within EL 4018 and these were sampled to determine geochemical characteristics. (See appenix IV and map NTd 3129). Two suites of ultramafic were recognised on geological and geochemical grounds.

The first suite represented by rockchip samples 970314, 970316 and 970317 consisted green-black pyroxenite with epidote and some vague suggestion of layering. Outcrops are typically upstanding with some slight elongation in the trend of country rock. Rock is fresh and unaltered at the surface. Geochemistry indicates no anomalous nickel, cobalt, chromium, gold, platinum, palladium or niobium. The rock is probably a late stage intrusive phase of mafic composition penecontemporaneous with metamorphism.

The second suite represented by rockchip samples 970318, 970319, 970320, 970321, 970322, 970323, 970042, 970043 comprised a range of altered ferruginous caprocks developed over highly altered rocks of probably dunitic composition. Botryoidal haematite and secondary



323 BLOCKS
1018·096 Km²



0 5 10 15 KILOMETRES

CR83/296

CRA EXPLORATION PTY LIMITED

ATULA BORE
EL 4018

REFERENCE SF 53-15 ILLOGWA CREEK SF53-11 HUCKITTA	
SCALE 1:250,000	DATE JULY 1982
AUTHOR WHJ	REPORT 130392
DRAWN SRJ	PLAN No NTa 643

chrosoprase characterise the rock in hand speciman. Contacts to country rock were nowhere observed due to unstable scree-covered margins, but overall outcrop shapes suggest a variety of structural situations. Geochemically the rocks are anomalous in nickel, cobalt and chromium, but not in gold, platinum,palladium or niobium.

The overall geochemistry, mineralogy and variety of concordant and discordant structural settings of this second suite of rocks suggests they are similar to alpine-type ultramafic of Phanerozoic age.

5.9. Two further rockchip samples (970045, 970325) of drussy diopside-garnet-quartz calcsilicate failed to return significantly anomalous assays.

5.10. Reconnaissance Drainage Sampling

Twenty-seven general reconnaissance gravel samples were collected from drainage within the Atula Bore EL (see NTd 3129).

Many of these reported chromite in quantities and freshness that indicate an immediate derivation from source, (i.e. sample 821410, 449 chromites). The source for these chromites is the previously described ultramafic bodies and these have no kimberlitic affinity.

One drainage sample 970046 was analysed for microdiamonds and returned a negative result.

5.11. The aeromagnetic and ground magnetic data correctly reflect ultramafic intrusives in the Atula Bore area. However, the chromites reported in heavy mineral suites, rockchip sampling

geochemistry and regional geological reconnaissance (see also CRAE Reports 130388, 130389, 130390, 130391) indicate non-kimberlitic affinity.

The suite of ultramafic bodies occur along NW-SE magnetic trends and range from concordant sill-like bodies to elongate discordant dykes and stocks. Mineralogy, rock association and structure resemble alpine-type ultramafics of Phanerozoic age. No economically anomalous metals were indicated and no further work is planned.

B.E. HARVEY

6. REFERENCES

N.T. Dept of Mines & Energy	1982	Brahma 1:100 000 sheet. Airborne Geophysical Survey Series Magnetic Intensity Contours, Total Count Contours. (May-Sept, 1981).
Harvey, B.E.	1983	EL 2789, MacDonald Downs, N.T. Arunta Block, Final Report. CRAE Report No.130388.
Harvey, B.E.	1983	Red Tank, EL 4017. Arunta Block, Final Report. CRAE Report No.130390.
Harvey, B.E.	1983	EL 2788, Frazer Creek, N.T. Arunta Block, Final Report. CRAE Report No.130389.
Harvey, B.E.	1983	EL 4017, Huckitta Creek, N.T. Arunta Block, Final Report. CRAE Report No.130391.

7. KEYWORDS

Chromium, cobalt, geophys-mag-rad, H-M study, nickel, Proterozoic, ultrabasic.

8. LIST OF PLANS

Plan No.	Title	scale
NTd 3129	Huckitta Creek EL 4074, Atula Bore EL 4018. Location Plan.	1:100 000
NTd 3217	Atula Bore EL 4018, Huckitta Creek EL 4074. Airborne Magnetics.	1:100 000

Heavy Mineral Ledgers

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS
21619	36.791/4015F	ILLOGWA CK	821404	G	31.6	0.121	*CHROMITE : 1 x +0.5
							: 0 x 0.4
							WEAR : FRESH WORN
							SHAPE : SUBHEDRAL
							SURFACE : SMOOTH CHIPPED
							LUSTRE : GREASY SHINY
							TEXTURE : VITRE/COMPACT
							STREAK : BROWN
							FRACTURE : SUB-CONCHOID
							FRAGMENTS : BLADED
21619	36.791/4015F	ILLOGWA CK	821405	G	38.4	0.215	*CHROMITE : 7 x +0.5
							WEAR : FRESH WORN
							SHAPE : SUBHEDRAL
							SURFACE : PITTED INDENTED
							: CHIPPED
							LUSTRE : GREASY DULL
							: SHINY
							TEXTURE : VITRE/COMPACT WITH SKIN
							FRACTURE : SUB-CONCHOID

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD		RESULTS
21619	36.791/4015F	ILLOGWA CK	821404	G	31.6	0.121	*CHROMITE:	1 x +0.5
								0 x 0.4
							WEAR :	FRESH WORN
							SHAPE :	SUBHEDRAL
							SURFACE :	SMOOTH CHIPPED
							LUSTRE :	GREASY SHINY
							TEXTURE :	VITR/COMPACT
							STREAK :	BROWN
							FRACTURE:	SUB-CONCHOID
							FRAGMENTS:	BLADED
21619	36.791/4015F	ILLOGWA CK	821405	G	38.4	0.215	*CHROMITE:	7 x +0.5
							WEAR :	FRESH WORN
							SHAPE :	SUBHEDRAL
							SURFACE :	PITTED INDENTED
							:	CHIPPED
							LUSTRE :	GREASY DULL
							:	SHINY
							TEXTURE :	VITR/COMPACT WITH SKIN
							STREAK :	BROWN
							FRACTURE :	SUB-CONCHOID

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO.	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS
21619	36.791/4015F	ILLOGWA CK	821408	G	31.2	0.027	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821409	G	27.9	0.152	*CHROMITE : 25 x +0.8 205 x +0.5 WEAR : FRESH WORN SHAPE : EUHEDRAL SUBHEDRAL SURFACE : SMOOTH LUSTRE : MATTE SHINY TEXTURE : VITR/COMPACT GRANULAR : WITH INCLUS. STREAK : BROWN FRACTURE : UNEVEN FRAGMENTS: GRANULAR
21619	36.791/4015F	ILLOGWA CK	821410	G	32.2	0.259	*CHROMITE: 43 x +0.8 406 x +0.5 WEAR : FRESH WORN SHAPE : EUHEDRAL SUBHEDRAL : ANHEDRAL SURFACE : SMOOTH FITTED : CHIPPED TEXTURE : VITR/COMPACT STREAK : BROWN

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS
21619	36.791/4015F	ILLOGWA CK	821411	G	28.4	0.125	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821412	G	28.2	0.051	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821417	G	31.6	0.295	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821418	G	31.6	0.574	*CHROMITE : 1 x +0.5 TEXTURE : VITR/COMPACT STREAK : BROWN
21619	36.791/4015F	ILLOGWA CK	821417	G	33.0	0.110	*CHROMITE : 21 x +0.8 84 x +0.5 WEAR : FRESH FRESH WORN SHAPE : EUHEDRAL SUBHEDRAL : ANHEDRAL ROUND SURFACE : SMOOTH PITTED : INDENTED GROOVED : SCULPTURED LUSTRE : GREASY DULL : SHINY TEXTURE :VITR/COMPACT WITH SKIN STREAK : BROWN FRAGMENTS : BLADED FRACTURE : SUB-CONCHOID

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO.	TYPE	--WEIGHTS-- RECD	OBSD			RESULTS
21619	36.791/4015F	ILLOGWA CK	821424	G	32.6	0.030	*CHROMITE		110 x +0.5
							WEAR	:	FRESH WORN
							SHAPE	:	EUHEDRAL SUBHEDRAL
								:	ANHEDRAL IRREGULAR
							SURFACE	:	PITTED FROSTED
							LUSTRE	:	MATTE SHINY
							TEXTURE	:	VITR/COMPACT GRANULAR
							STREAK	:	BROWN
							FRACTURE	:	UNEVEN SUB-CONCHOID
							FRAGMENTS	:	RIND LIKE GRANULAR
21619	36.791/4015F	ILLOGWA CK	821425	G	26.7	0.029	*CHROMITE	:	2 x +0.5
							WEAR	:	FRESH WORN
							SHAPE	:	EUHEDRAL SUBHEDRAL
							SURFACE	:	PITTED

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821427	G	27.4	0.052	*CHROMITE	:	33 x +0.8	
							WEAR	:	FRESH	
							SHAPE	:	EUHEDRAL	SUBHEDRAL
							SURFACE	:	SMOOTH	PITTED
							LUSTRE	:	SHINY	
							TEXTURE	:	VITR/COMPACT	WITH RIM
							STREAK	:	BROWN	
							FRACTURE	:	UNEVEN	
							FRAGMENTS	:	BLADED	
21619	36.791/4015F	ILLOGWA CK	821428	G	28.6	0.031	*CHROMITE	:	308 x +0.5	
							WEAR	:	FRESH WORN	
							SHAPE	:	SUBHEDRAL	ANHEDRAL
							SURFACE	:	SMOOTH	PITTED
							LUSTRE	:	MATTE	SHINY
							TEXTURE	:	VITR/COMPACT	
21619	36.791/4015F	ILLOGWA CK	821434	G	30.0	0.143	NEGATIVE			
21619	36.791/4015F	ILLOGWA CK	821435	G	25.5	0.019	NEGATIVE			
21619	36.791/4015F	ILLOGWA CK	821436	G	26.2	0.038	NEGATIVE			

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS
21619	36.791/4015F	ILLOGWA CK	821440	G	25.6	0.012	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821441	G	21.1	0.010	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821445	G	30.7	0.010	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821448	G	29.6	0.063	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821449	G	26.0	0.032	*CHROMITE 1 x +0.5
21619	36.791/4015F	ILLOGWA CK	821452	G	21.0	0.013	NEGATIVE
21619	36.791/4015F	ILLOGWA CK	821446	G	28.6	0.049	*CHROMITE 2 x 10.8 4 x 10.5 WEAR : FRESH WORN SHAPE : EUHEDRAL SURFACE : SMOOTH LUSTRE : MATTE TEXTURE : VITR/COMPACT WITH RIM STREAK : BROWN

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD	RESULTS	
21432	36.791/4254F	ILLOGWA CK	970324	L	31.5	0.315	*CHROMITE	6 x +0.5 21 x +0.4
							WEAR :	FRESH
							SHAPE :	EUHEDRAL SUBHEDRAL
							SURFACE :	PITTED INDENTED
							LUSTRE :	MATTE
							TEXTURE :	GRANULAR
							STREAK :	BROWN
							FRACTURE :	CONCHOIDAL
21432	36.791/4015F	ILLOGWA CK	970324	L	18.7	0.377	NEGATIVE	
21403	36.791/4015F	ILLOGWA CK	970044	L	28.2	0.065	*CHROMITE :	1 x +0.5 0 x +0.4
							WEAR :	FRESH WORN
							SHAPE :	SUBHEDRAL
							SURFACE :	SMOOTH
							LUSTRE :	DULL
							TECTURE :	VITR/COMPACT
							STREAK :	BROWN
							FRACTURE :	UNEVEN
							FRAGMENTS:	GRANULAR

KIMBERLITIC INDICATORS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS-- RECD	OBSD		RESULTS	
21403	36.791/4015F	ILLOGWA CK :	970046	G	29.0	0.074	*CHROMITE	7 x +0.8 63 x +0.5	
							WEAR :	FRESH WORN	
							SHAPE :	EUHEDRAL	SUBHEDRAL
							SURFACE :	PITTED	
							LUSTRE :	MATTE	SHINY
							TEXTURE :	VITR/COMPACT	WITH SKIN
							STREAK :	BROWN	
							FRACTURE :	UNEVEN	
							FRAGMENTS:	GRANULAR	

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO.	TYPE	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821404	G	S:AMPHIBOLE	F:APATITE	O:EPIDOTE	P:GARNET
					S:HEMATITE	S:ILMENITE	F:KYOKITE	A:LIMONITE
					F:MICA	F:MONAZITE	F:PYRITE	F:RUTILE
					S:SILIMANITE	T:ANDALUSITE	F:SPHENE	T:SPINEL
					F:TOURMALINE	R:ZIRCON	S:ROCK FRAGMNT	
21619	36.791/4015F	ILLOGWA CK	821405	G	P:AMPHIBOLE	F:APATITE	F:CLINOZOISITE	A:EPIDOTE
					O:GARNET	O:HEMATITE	O:ILMENITE	O:LIMONITE
					F:MICA	T:MONAZITE	F:QUARTZ	F:RUTILE
					S:SILLIMANITE	O:SPHENE	S:TOURMALINE	R:ZIRCON
					O:ROCK FRAGMNT			
21619	36.791/4015F	ILLOGWA CK	821406	G	F:AMPHIBOLE	F:DIOPSIDE	F:EPIDOTE	A:GARNET
					O:ILMENITE	F:KYANITE	F:LIMONITE	R:MICA
					F:MONAZITE	F:RUTILE	A:SILLIMANITE	F:TOURMALINE
					R:ZIRCON	F:ROCK FRAGMNT	T:MAGNETITE	
21619	36.791/4015F	ILLOGWA CK	821407	G	O:AMPHIBOLE	F:BARITE	F:CLINOZOISITE	F:EPIDOTE
					P:GARNET	F:HEMATITE	A:ILMENITE	F:KYANITE
					F:LEUCOXENE	F:LIMONITE	F:MONAZITE	F:QUARTZ
					F:RUTILE	O:SILLIMANITE	F:SPHENE	F:TOURMALINE
					F:ZIRCON	F:ROCK FRAGMNT		
21619	36.791/4015F	ILLOGWA CK	821408	G	O:AMPHIBOLE	F:BARITE	F:EPIDOTE	A:GARNET
					F:HEMATITE	O:ILMENITE	F:KYANITE	A:LIMONITE
					F:MICA	F:RUTILE	S:SILLIMANITE	F:TOURMALINE

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821409	G	P:AMPHIBOLE	R:ARATASE	F:APATITE	C:GARNET
					F:ILMENITE	R:KYANITE	F:LEUCOXENE	F:LIMONITE
					R:ORTHO-PYROXE	F:QUARTZ	F:RUTILE	F:SILLIMANITE
					F:SPHENE	F:TOURMALINE	F:ZIRCON	S:ROCK FRAGMNT
21619	36.791/4015F	ILLOGWA CK	821410	G	P:AMPHIBOLE	O:APATITE	O:GARNET	F:ILMENITE
					F:LEUCOXENE	F:LIMONITE	R:MICA	R:RUTILE
					F:SPHENE	F:TOURMALINE	F:ZIRCON	
21619	36.791/4015F	ILLOGWA CK	821411	G	S:AMPHIDOLE	F:APATITE	P:GARNET	F:HEMATITE
					S:ILMENITE	R:KYANITE	S:LIMONITE	F:MICA
					F:MONAZITE	F:RUTILE	R:SCHEELITE	F:SILLIKANITE
					S:SPHENE	T:SPINEL	O:TOURMALINE	F:ZIRCON
					S:ROCK FRAGMNT			
21619	36.791/4015F	ILLOGWA CK	821412	G	O:AMPHIBOLE	F:BARITE	F:EPIDOTE	P:GARNET
					F:KYANITE	F:LIMONITE	F:MICA	F:RUTILE
					S:SILLIMANITE	F:SPHENE	F:TOURMALINE	F:ZIRCON
					F:ROCK FRAGMNT			
21619	36.791/4015F	ILLOGWA CK	821417	G	F:AMPHIBOLE	A:GARNET	O:HEMATITE	S:ILMENITE
					R:KYANITE	F:LIMONITE	F:MICA	F:MONAZITE
					F:QUARTZ	F:RUTILE	A:SILLIMANITE	F:ZIRCON
					F:TOURMALINE	F:ROCK FRAGMNT		

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821418	G	F:AMPHIBOLE	F:ANDALUSITE	F:EPIDOTE	P:GARNET
					F:HEMATITE	O:ILMENITE	F:KYANITE	F:LEUCOXENE
					O:LIMONITE	T:MARTITE	F:MICA	F:MONAZITE
					A:SILLIMANITE	R:STAUROLITE	F:TOURMALINE	R:ZIRCON
21619	36.791/4015F	ILLOGWA CK	821419	G	O:AMPHIBOLE	F:APATITE	R:CLINOZOISITE	F:EPIDOTE
					A:GARNET	S:HEMATITE	P:ILMENITE	O:KYANITE
					F:LEUCOXENE	O:LIMONITE	T:PYRITE	O:RUTILE
					S:SILLIMANITE	T:SPHENE	R:SPINEL	O:TOURMALINE
					F:ZIRCON			
21619	36.791/4015F	ILLOGWA CK	821424	G	O:AMPHIBOLE	F:APATITE	O:BIOTITE	R:CLINOPYROXEN
					S:GARNET	O:HEMATITE	O:ILMENITE	R:KYANITE
					S:MICA	F:MONAZITE	O:QUARTZ	F:RUTILE
					O:SILLIMANITE	O:SPHENE	F:TOURMALINE	O:ZIRCON
					A:ROCK FRAGMNT			
21619	36.791/4015F	ILLOGWA CK	821425	G	A:AMPHIBOLE	O:APATITE	F:BARITE	T:CORUNDUM
					R:EPIDOTE	A:GARNET	F:KYANITE	F:LIMONITE
					F:MONZAITE	F:QUARTZ	F:RUTILE	O:SILLIMANITE
					F:SPHENE	F:ZIRCON		
21619	36.791/4015F	ILLOGWA CK	821427	G	S:AMPHIBOLE	F:APATITE	R:BARITE	F:BIOTITE
					F:EPIDOTE	A:GARNET	O:ILMENITE	R:KYANITE
					S:LIMONITE	R:MONAZITE	F:RUTILE	P:SILLIMANITE
					F:SPHENE	T:SPINEL	F:TOURMALINE	F:ZIRCON

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821428	G	S:AMPHIBOLE	O:APATITE	T:CORUNDUM	T:EPIDOTE
					S:GARNET	O:HEMATITE	P:ILMENITE	F:KYANITE
					F:LIMONITE	O:MONAZITE	R:MUSCOVITE	F:RUTILE
					C:SILLIMANITE	O:SPHENE	F:TOURMALINE	F:ZIRCON
					S:ROCK FRAGMNT			
21619	36.791/4015F	ILLOGWA CK	821434	G	O:AMPHIBOLE	S:APATITE	A:CLINOZOISITE	T:DIOPSIDE
					F:EPIDOTE	A:GARNET	C:HEMATITE	A:ILMENITE
					F:KYANITE	F:LIMONITE	O:MICA	S:MONAZITE
					F:QUARTZ	T:PYRITE	F:RUTILE	O:SILLIMANITE
					O:SPHENE	F:TOURMALINE	F:ROCK FRAGMNT	
21619	36.791/4015F	ILLOGWA CK	821435	G	F:AMPHIBOLE	F:BARITE	R:EPIDOTE	S:GARNET
					A:ILMENITE	F:KYANITE	F:LIMONITE	F:MONAZITE
					F:QUARTZ	F:RUTILE	S:SILLIMANITE	F:TOURMALINE
					R:ZIRCON	F:ROCK FRAGMNT		
21619	36.791/4015F	ILLOGWA CK	821436	G	O:AMPHIBOLE	F:APATITE	F:CLINOPYROXEN	F:CLINOZOISITE
					F:EPIDOTE	O:GARNET	S:ILMENITE	R:KYANITE
					O:LIMONITE	F:MICA	R:MONAZITE	O:QUARTZ
					F:RUTILE	O:SILLIMANITE	R:SPHENE	O:TOURMALINE
					O:ROCK FRAGMNT			

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	RESULTS			
21619	36.791/4015F	ILLOGWA CK	821440	G	A:AMPHIBOLE	F:BIOTITE	T:CORUNDUM	F:EPIDOTE
					A:GARNET	F:ILMENITE	R:KYANITE	O:LIMONITE
					R:MONAZITE	R:MUSCOVITE	F:RUTILE	O:SILLIMANITE
					R:STAUROLITE	F:TOURMALINE	C:ROCK FRAGMNT	
21619	36.791/4250F	ILLOGWA CK	821441	G	F:AMPHIBOLE	R:EPIDOTE	P:GARNET	O:ILMENITE
					P:KYANITE	F:MONAZITE	F:RUTILE	F:SILLIMANITE
					R:STAUROLITE	F:TOURMALINE	F:ZIRCON	
21619	36.791/4254F	ILLOGWA CK	821445	G	F:AMPHIBOLE	F:EPIDOTE	P:GARNET	S:LIMONITE
					F:MICA	R:MONAZITE	R:QUARTZ	F:RUTILE
					F:SILLIMANITE	F:TOURMALINE		
21619	36.791/4254F	ILLOGWA CK	821446	G	O:AMPHIBOLE	T:CLINOPYROXENE	P:GARNET	R:ILMENITE
					R:KYANITE	O:LIMONITE	P:MONAZITE	R:RUTILE
					F:SILLIMANITE	R:SPHENE	R:STAUROLITE	O:TOURMALINE
					R:ZIRCON			
21619	36.791/4015F	ILLOGWA CK	821448	G	O:AMPHIBOLE	F:BIOTITE	F:EPIDOTE	P:GARNET
					F:ILMENITE	F:KYANITE	S:LIMONITE	O:MARTITE
					F:MONAZITE	F:QUARTZ	R:RUTILE	O:SILLIMANITE
					O:TOURMALINE	O:ROCK FRAGMNT	F:MAGNETITE	
21619	36.791/4015F	ILLOGWA CK	821447	G	P:AMPHIBOLE	R:BIOTITE	F:EPIDOTE	A:GARNET
					F:ILMENITE	O:LIMONITE	F:MONAZITE	R:RUTILE
					F:SILLIMANITE	F:SPHENE	R:STAUROLITE	S:TOURMALINE
					R:ZIRCON			

OTHER MINERALS

CRA REPORT: BELMONT

DPO	COST CODE	AREA	SAMPLE NO	TYPE	RESULTS			
21619	36.791/4254F	ILLOGWA CK	821452	G	O:AMPHIBOLE	F:APATITE	F:EPIDOTE	O:GARNET
					S:LIMONITE	F:MONAZITE	F:RUTILE	F:SILLIMANITE
					O:SPHENE	F:SPINEL	O:TOURMALINE	P:ROCK FRAGMNT
21403	36.791/4015F	ILLOGWA CK	970046	L	O:AMPHIBOLE	F:APATITE	F:EPIDOTE	P:GARNET
					O:ILMENITE	F:LEUCOXENE	F:LIMONITE	F:MONAZITE
					F:QUARTZ	F:RUTILE	O:SILLIMANITE	O:SPHENE
					S:TOURMALINE	F:ZIRCON		
21403	36.79/4015F	ILLOGWA CK	970044	L	F:AMPHIBOLE	R:ARDALUSITE	P:EPIDOTE	P:GARNET
					F:ILMENITE	O:LIMONITE	F:MONAZITE	F:RUTILE
					F:SILLIMANITE	F:TOURMALINE	F:ZIRCON	
21432	36.791/4254F	ILLOGWA CK	970315	L	O:ALMANDINE	P:AMPHIBOLE	F:ANATASE	S:BIOTITE
					F:CLINOZOISITE	O:EPIDOTE	A:GARNET	R:HEMATITE
					O:ILMENITE	F:KYANITE	R:MICA	O:MONAZITE
					F:QUARTZ	R:RUTILE	S:SILLIMANITE	S:SPHENE
					F:TOURMALINE	R:ZIRCON	S:ROCK FRAGMNT	R:ANDRADITE
21342	36.791/4254F	ILLOGWA CK	970324	L	P:ALMANDINE	O:AMPHIBOLE	R:ANDALUSITE	F:BIOTITE
					R:EPIDOTE	S:GARNET	O:ILMENITE	F:KYANITE
					F:MONAZITE	F:RUTILE	O:SILLIMANITE	F:TOURMALINE
					R:ZIRCON			

MICRODIAMOND RESULTS

CRA EXPLORATION PTY LIMITED

MICRODIAMOND RESULTS

To: W.J. Atkinson

Copy: W.H. Johnston

B.E. Harvey

I. COLLIVER

From: A.E. HALL & J.S. MOON

G -0.4mm Gravel Sample

L -0.4mm Loam Sample

R Crushed Rock Sample

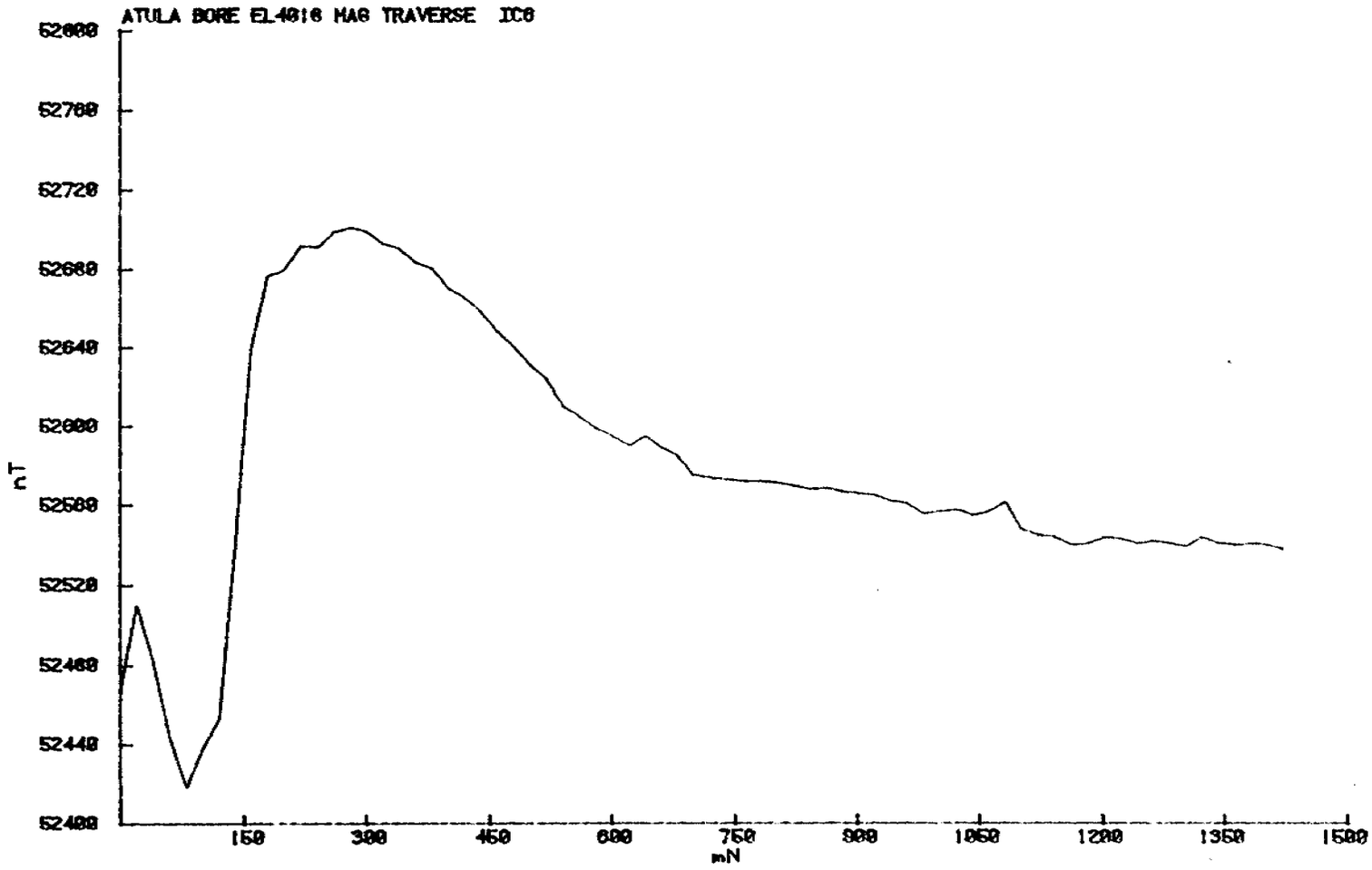
C Crushed Drill Core Sample

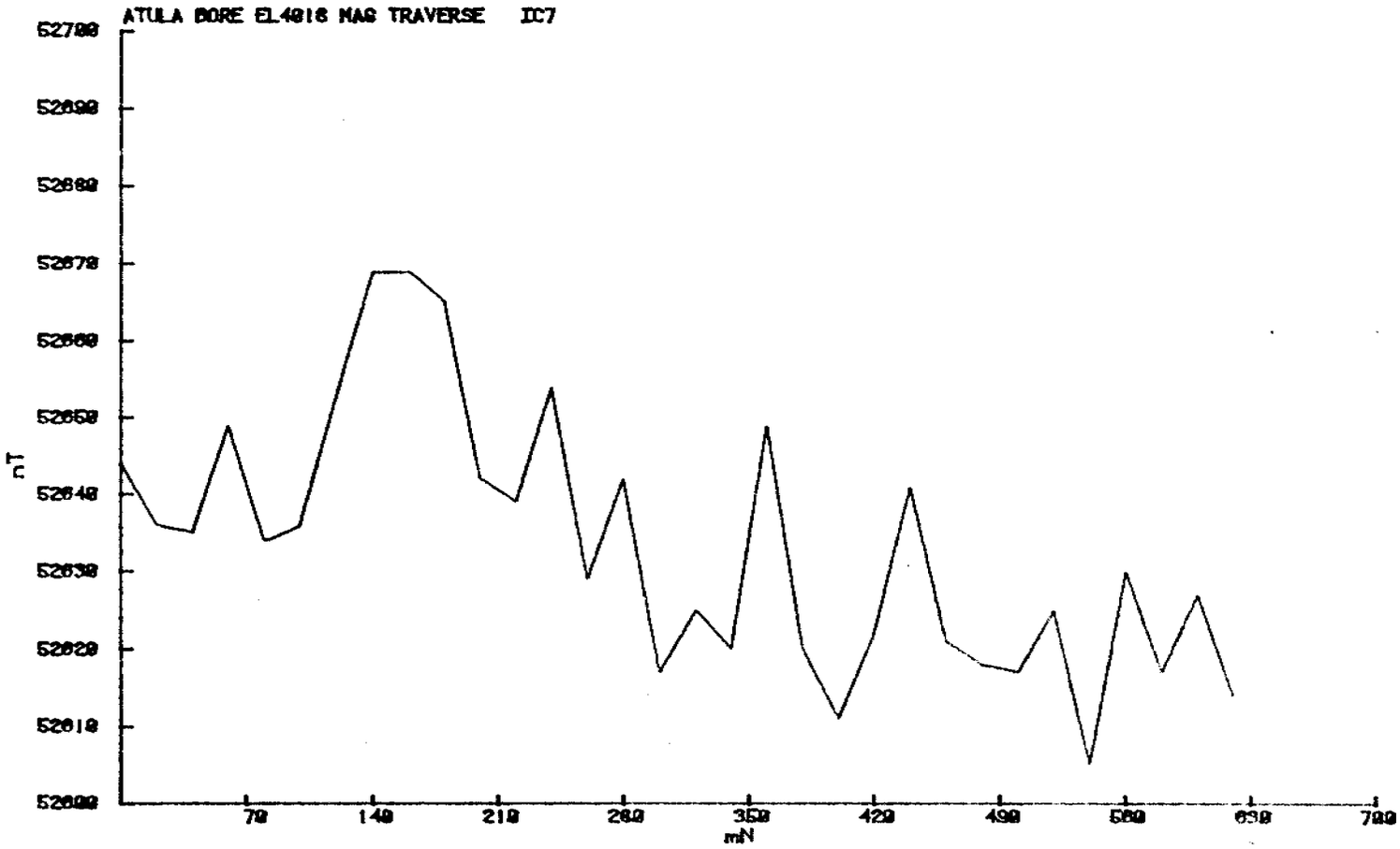
D Crushed Drill Cuttings Sample

REPORT NO	SAMPLE NO	DPO NO.	COST CODE	AREA	WEIGHT KGS.	Summary of Microdiamond Results
MP2049/82	970044	21403	36.791/ 4015F	ILLOGWA CREEK	6.4	NIL
MP2048/82	970046	21403	36.791/ 4015F	ILLOGWA CREEK	8.4	NIL

APPENDIX III

GROUND MAGNETOMETER PROFILES


ATULA BORE EL4016 MAG TRAVERSE IC8
52800
52760
52720
52680
52640
52600
52560
52520
52480
52440
52400
nT
150
300
450
600
750
900
1050
1200
1350
1500
mN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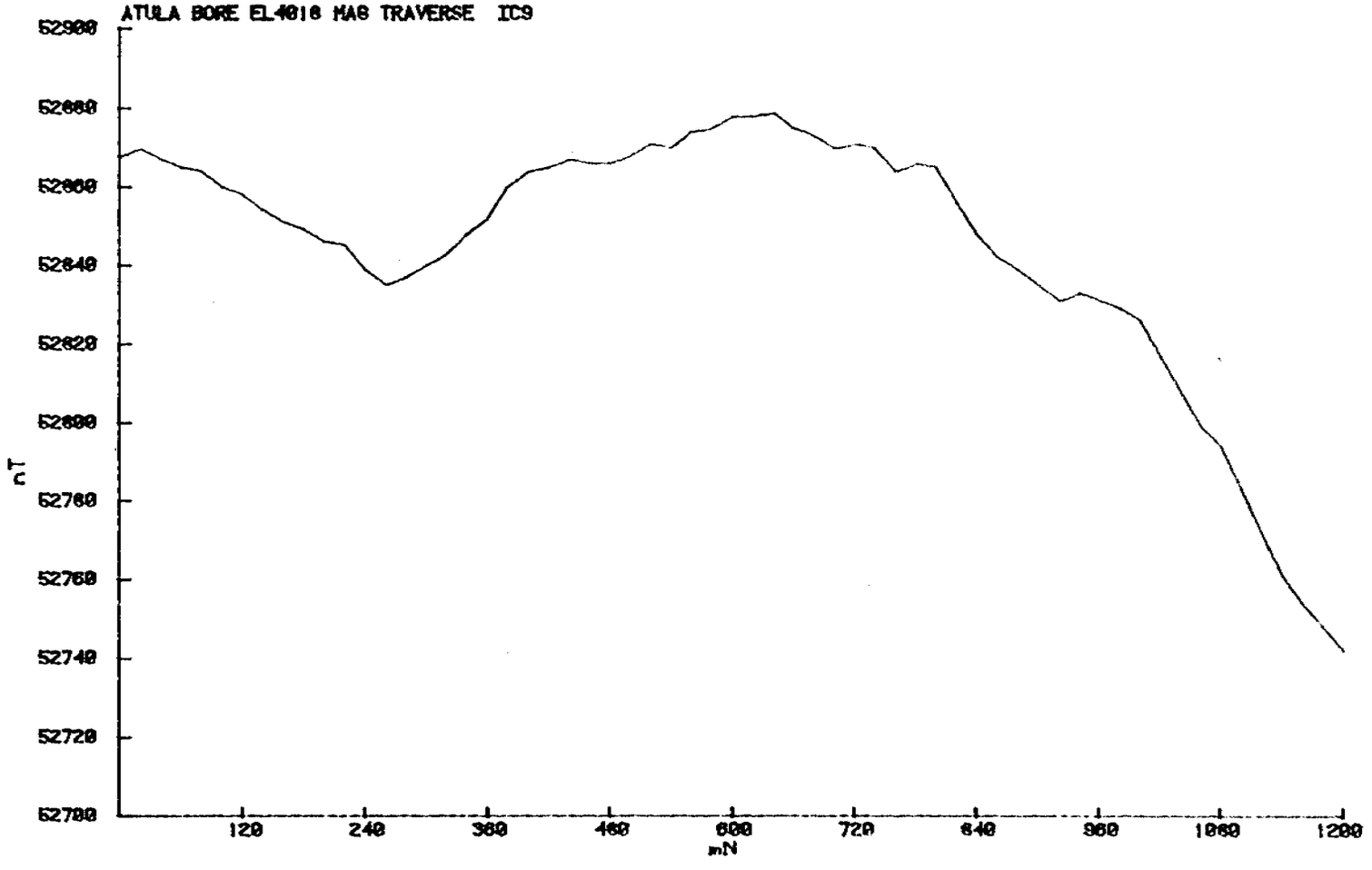
52690
52680
52670
52660
52650
52640
52630
52620
52610
52600
nT
70
140
210
280
350
420
490
560
630
700
mN


ATULA BORE EL4016 MAG TRAVERSE IC6
52800
52760
52740
52720
52700
52660
52640
52620
52600
nT
120
240
360
480
600
720
840
960
1080
1200
mN


ATULA BORE EL4016 MAG TRAVERSE IC9
52900
52880
52860
52840
52820
52800
52780
52760
52740
52720
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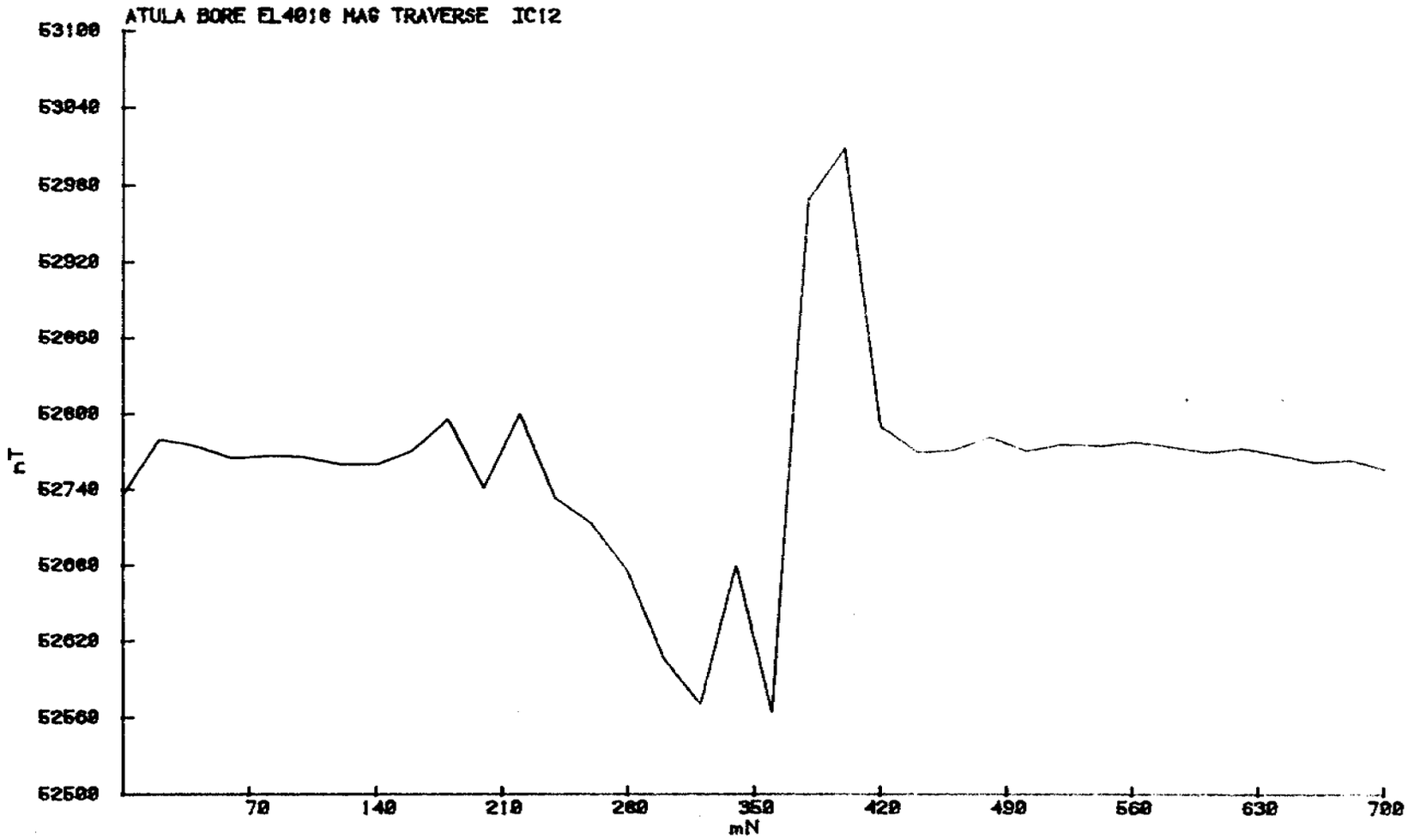
360
480
600
720
840
960
1080
1200
mN


ATULA BORE EL4016 MAG TRAVERSE IC12
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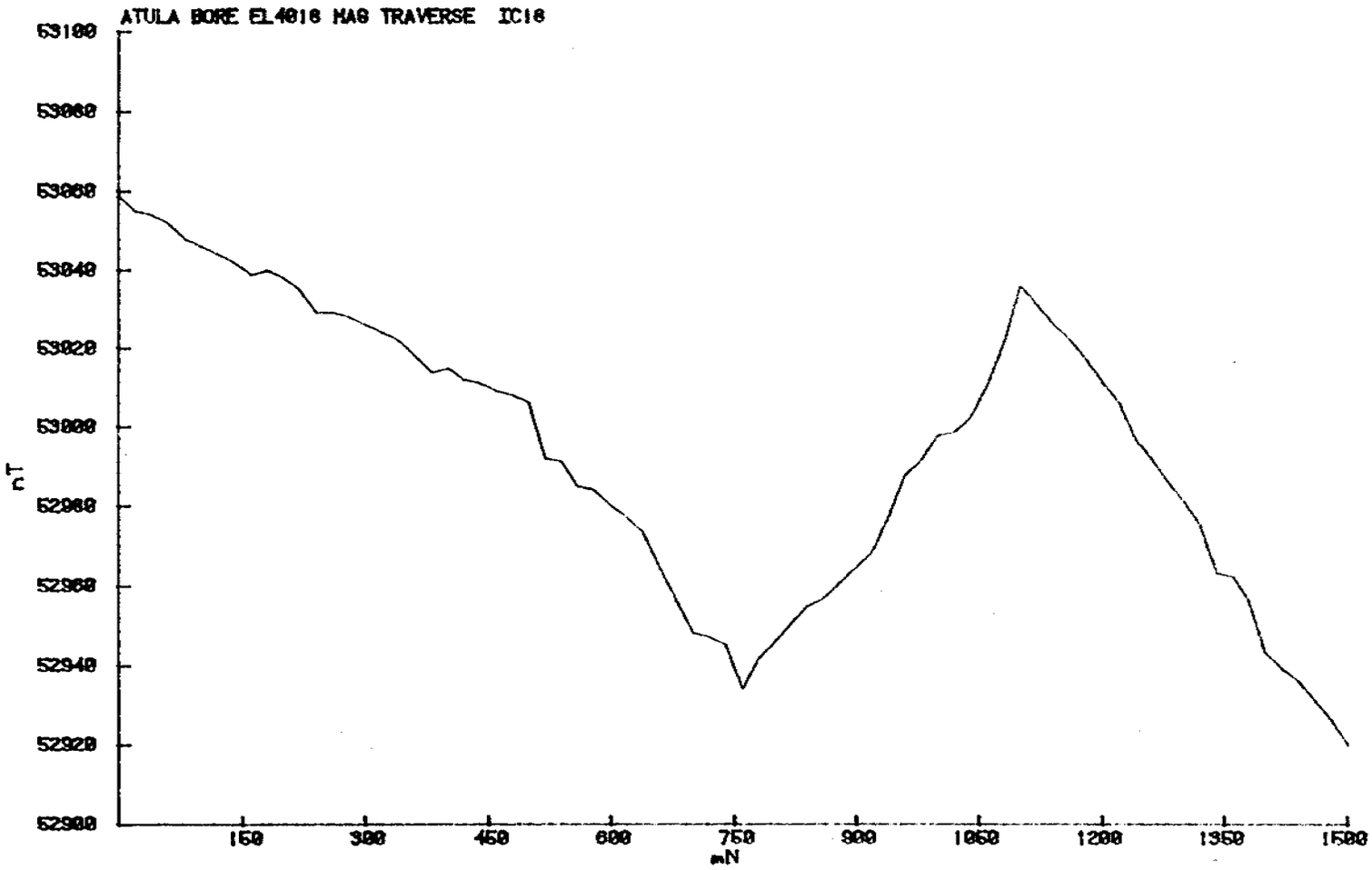
53040
52980
52920
52860
52800
52740
52680
52620
52560
52500
nT
70
140
210
280
350
420
490
560
630
700
mN


ATULA BORE EL4016 MAG TRAVERSE IC16
53100
53060
53080
53040
53020
53000
52980
52960
52940
52920
52900
nT
150
300
450
600
750
900
1050
1200
1350
1500
mN

APPENDIX IV

GEOCHEMICAL ROCK SAMPLE LEDGER

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL ROCK CHIP SAMPLING LEDGER

PROJECT Arunta

E.L. Ahula Bore

MAP OR PHOTO REFERENCE

* gr – grab
co – composite
ch – channel

SAMPLE Nos

D.P.O. No. 21750

DATE 9-8-82

COLLECTED BY Bell

ANALYSED BY Comlabs

SHEET No

Grid Co-ordinates	Sample Number	Sample Width	Sample Type	Metal Content, p.p.m. Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	Ba	Sb	Te	U	Th	Scinto c.p.s	Geological Observations	V	Cd
J/c Run 1 0190	970042	5	Co	26	[illegible]	36	46	4	70	<4	<10	<4	<2	<1	<0.05	195	360	<4	<10		8	70	Fe – saturated horizon beneath muscovite gneiss.	40	<1
																(6)							Mag sus 0.1 – 0.2 overall width >5m(?)		
J/c Run 1 0190	970043	10	Co	12	38	[illegible]	4	<4	48	<4	<10	6	2	<1	<0.05	[illegible]	[illegible]	8	<10		22	85	Fe saturated horizon as above, [illegible] western extent ~500m W of 970042	[illegible]	<1
																							Amorphous massive Fe-stone		
J/c Run 1 0184	970045	10	Co	4	8	4	<4	<4	6	<4	<10	6	2	<1	<0.05	175	80	4	<10		<4	50	Calc-silicate Fe-rock	30	<1

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL ROCK CHIP SAMPLING LEDGER

D.P.O. No. 21422

DATE 26-1-82

PROJECT Arunta 0

EL Alice Bore EL 4018

* gr – grab
co – composite
ch – channel

SAMPLE Nos

COLLECTED BY BEH

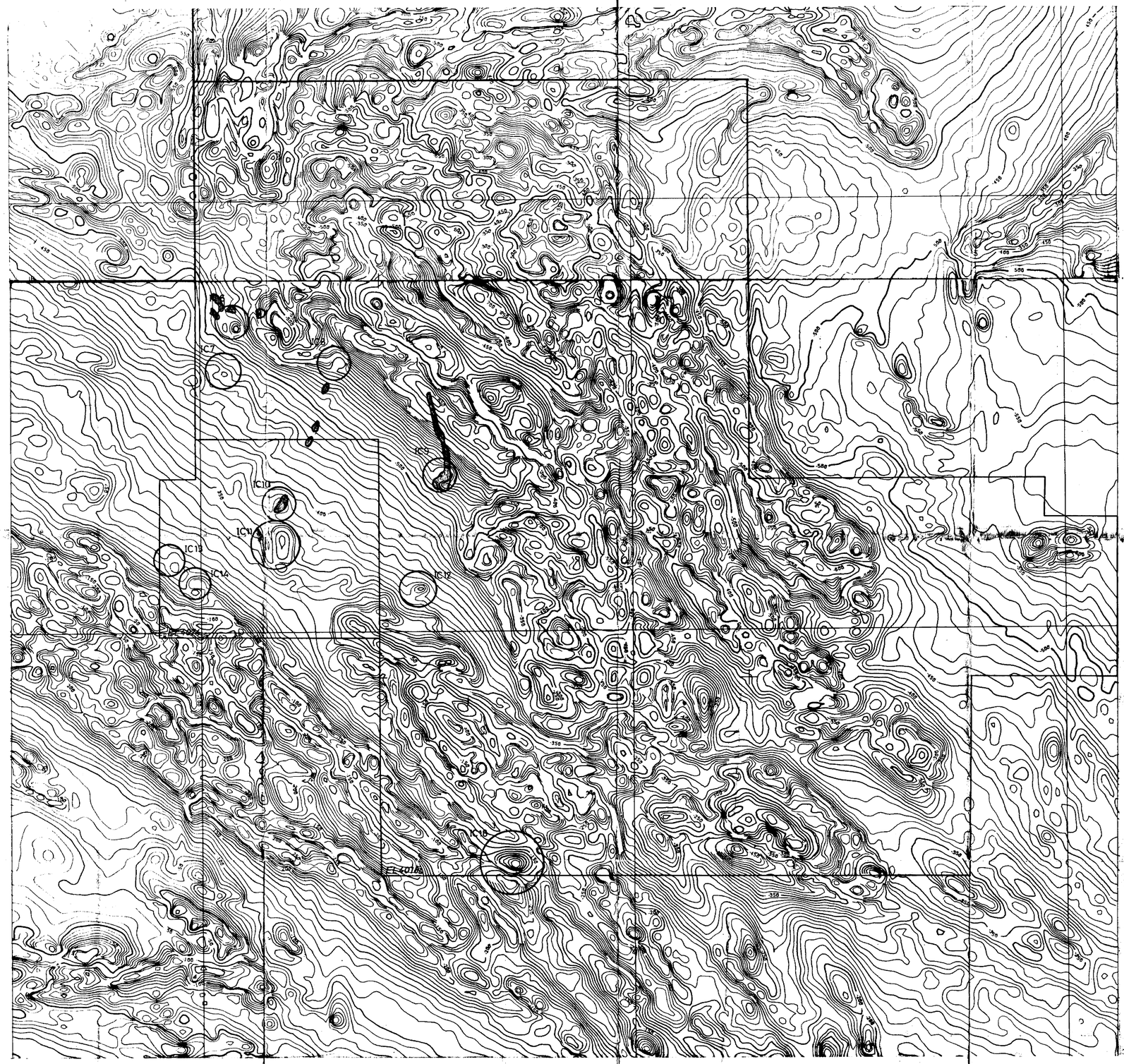
SHEET No

MAP OR PHOTO REFERENCE Illogwa Ck. Huckitta

ANALYSED BY Comlabs

Grid / Record notes	Sample Number	Sample dia *	Sample type	Metal Content, ppm Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	Pt	Pd	Nb	U	Th	Scinto c p s	Geological Observations
Run 1/0184	970314	Co	50			12	26	8	16						<0.05		<005	<0.005	6				Green-black pyroxenite ultramafic, some epidote vague suggestion of layering
"	970316	50	Co			8	<4	<4	<4						<0.05		<0.05	<0.005	12				" " slight elongation 330°-150°
"	970317	30	Co			8	<4	<4	10						<0.05		<0.05	<0.005	8				" "
Run 1/0188	970318	80	Co			12	940	40	530						<0.05		<0.05	<0.005	3				Altered silicified network gossan
Run 1/0188	970319	50	Co			75	2500	1250	3100						<0.05		<0.05	<0.005	3				"
Run 1/0190	970320	30	Co			12	1850	75	590						<0.05		<0.05	<0.005	3				"
"	970321	30	Co			10	360	42	470						<0.05		<0.05	<0.005	3				"
"	970322	30	Co			6	16	10	20						<0.05		<0.05	<0.005	4				Fresh u.m. vaguely layered Trending 330° -150° dip 45° NE
Run 1/0190	970323	30	Co			10	530	26	470						<0.05		<0.05	<0.005	2				
R1/0188	970325	1.5	Co	<4	130	30	60	34	55	<4				<1		2400	<0.05	<0.005	4	<4	<4		Altered silicified gossan cap over U.M. " Dowsing traverse assay calculate Diopside garnet quartz

Printed



TN

LEGEND

IC18 — SELECTED DIPOLAR MAGNETIC RESPONSES

AIRBORNE SURVEY DATA

LINE SPACING	500m.
LINE DIRECTION	000 180 DEGREES
NOMINAL TERRAIN CLEARANCE	100m.
NOMINAL SAMPLING INTERVAL	55m.
AQUISITION INTERVAL	1.0 sec.
CONTOUR INTERVAL	10 nano Tesla

REGIONAL MAGNETIC FIELD REMOVED

OUTCROP OF FERRUGINOUS CAPROCK / ULTRAMAFIC BODIES

0 1 2 3 4 5 6 7 KILOMETRES

OR83/296

CRA EXPLORATION PTY LIMITED

ATULA BORE EL 4018
HUCKITTA CREEK EL 4074
AIRBORNE MAGNETICS
DATA SOURCE N.T. MINES & ENERGY

REFERENCE ILLOGWA CREEK SF53-15 HUCKITTA SF 53-11	
SCALE 1:100,000	DATE OCTOBER 1983
AUTHOR BEH	REPORT 130392
DRAWN SRJ	PLAN No NTd 3217

HUCKITTA H.S. 8 Km

Blackbird Bore

"JINKA"

Prosser's Bore

22° 55'

PLENTY

Dead Horse Soak (Govt)

821414

L/G

821288

Ghost Gum Bore

RIVER

PLENTY

First Up Bore

HIGHWAY

JERVOIS H.S. 20K

WOTAN

970325

970043

970042

135° 35'

135°50'

MOUNT TORNER

IC 6

970044 CHROMITE 1x +0·5 NIL MICRO

Bottom Dam

IC 7

970324 CHROMITE 5x+0·5 21x+0·8

IC 8

CHROMITE 821408 18x+0·5

821406 Negative

821407 Negative

Table Top Bore

821404 CHROMITE 1x+0·5

CHROMITE 821405 7x+0·5

970323

821412 Negative

CHROMITE 821418 1x+0·5

821417 Negative

821419 CHROMITE 21x+0·5 84x+0·5

ATULA

970000 5x+0·5

970322

23°04'

970321

CHROMITE 821428 308+0·5

970317

970316

970045

821429 Negative

CHROMITE 821424 110x+0·5

CHROMITE 970046 7x+0·8 63x+0·5 NIL MICRO

821409 CHROMITE 28x+0·8 205x+0·5

821410 CHROMITE 28x+0·8 206x+0·5

821411 Negative

IC 9

970319

821434 Negative

821425 CHROMITE 2x+0·5

23°05'

IC 10

970320

(Drillholes (BHP)

970318

821435 Negative

821427 CHROMITE 33x+0·8

135°36'

23°06'

821392 Negatives

970304 CHROMITE 70x+0·8 20x+0·6 6x+0·4 NIL MICRO

IC 11

Drillholes (BHP)

IC 13

970314

970315

Negative

IC 14

IC 12

CHROMITE 970303 5x+0·8 70x+0·5 60x+0·4 NIL MICRO

821395 Negative

Crossing Bore

Atula Bore

821441 Negative

136°00'

EL 4074

23°00'

821439

821440 Negative

821436 Negative

821445 Negative

CHROMITE 821446 4x+0·8 44x+0·5

23° 10'

CREEK

Brahma Bore (Abandoned)

Yd

HUCKITTA

135°40'

821448 Negative

135°56'

CHROMITE 821449 1x+0·5

821452 Negative

IC 18

PB Hall Bore

EL4018

23°15'

CREEK

T Newmarket Bore (abandoned)

Yd

Dingo Dam

Claypan

Stevens Creek

New Black Diamond Bore

Old Dry Lakes

Old Dry Lake

TN

LEGEND

- DRAINAGE SAMPLE
- x LOAM SAMPLE
- ROCK SAMPLE
- IC 11 MAGNETIC DIPOLAR FEATURE

0 1 2 3 4 5 6 7 KILOMETRES

CR83/296

CRA EXPLORATION PTY LIMITED

ATULA BORE EL 4018
HUCKITTA CREEK EL 4074
SAMPLE LOCATION/MAG FEATURES

REFERENCE ILLOGWA CREEK SF 53-15, HUCKITTA SF 53-11	
SCALE 1:100,000	DATE JUNE 1983
AUTHOR BEH	REPORT T30392
DRAWN SRJ	PLAN No NTd 3129