CRA EXPLORATION PTY LIMITED

KOVACS/MOORE ROAD MACHINERY (N.T.) PTY LIMITED
EL 1910, ARTHUR CREEK N.T.
ANNUAL REPORT
PERIOD ENDING 1st DECEMBER, 1981.

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: Moore Road Machinery Pty Ltd.

: N.T. Department of Mines and Energy

date : December, 1981.

Report No: 10994

CONTENTS

1. SUMMARY

CRA Exploration Pty Limited carried out a geochemical drainage survey and followed-up on anomalies from reconnaissance.

The original survey comprised 28 geochemical drainage samples and 28 trapsite gravel samples; follow-up included 19 geochemical drainage samples and 12 panned concentrates.

No significant geochemical drainage anomalies were identified.

Known copper and tungsten mineralisation lying within mineral leases and a claim covered in joint venture agreement were visited and assessed. They do not in themselves constitute prospective situations, however they are part of a consistent mineralised horizon.

Photo-interpretative geological mapping was completed at 1:50 000 scale.

Heavy mineral observation results were received for two reconnaissance gravel samples. These were negative for kimberlitic indicators.

2. INTRODUCTION

Farm in and Joint Venture Agreement between Moore Road Machinery (N.T.) Proprietary Limited, Steven Kovacs and CRA Exploration Pty Limited covering EL 1910, Arthur Creek, was approved on 17th July, 1981. Statutory reduction by 50% was carried out in November, 1981.

CRA Exploration undertook a geochemical drainage survey and followed-up on anomalies in the course of geological mapping and assessment of mineral claims and leases covered in the agreement.

This report refers to work carried-out and results received in the period to 1st December, 1981.

3. CONCLUSIONS

Follow-up on geochemical drainage anomalies identified in the reconnaissance survey was negative for large scale surface mineralisation.

Geological mapping and structural interpretation showed mineralisation localities were strata bound.

Two units (pЄo (1) pЄo (3)) within the Bonya Schists were identified as potential ore-bearing horizons.

4. GEOCHEMICAL DRAINAGE SURVEY

4.1. Geochemical reconnaissance survey

CRAE carried out a helicopter assisted geochemical drainage survey on EL 1910. A total of 28 samples were collected from streams draining EL 1910 which achieved a sample density of one sample per 4.8 square km.

Sampling was carried out on pre-planned sites on the 1:250,000 scale Huckitta topographic mapsheet, transposed to 1:83,000 scale black and white aerial photography. A standard stream sediment sample was collected from suitable sites by sieving four mesh sizes +40 (355μm), -40 (355μm), -60 (250μm) and -80 (180μm). Approximately 100-150 gm of each were collected in numbered kraft paper packets. A scan of the stream sediments, in situ was carried out with a Scintrex BGS-2 total count gamma-ray scintillometer. Observations on outcrop and petrological and mineralogical composition of the stream sediments was recorded at the site.

The -80 mesh and -40 mesh fraction were forwarded to AMDEL for assay by AAS of lead, zinc, copper, cobalt, chromium, maganese and nickel code C1, AAS silver, molybdenum and arsenic code C2, AAS gold code C3/3, XRF uranium, tin and tungsten.

The following large group of anomalies were associated with drainage off the Georgina Basin sedimentary cover sequence of Palaeozoic age.

Sample 821035, slightly anomalous in lead in -80 mesh and slightly anomalous in cobalt in -40 mesh.

Sample 821034, slightly anomalous in gold and cobalt in -40 mesh.

Sample 821031, slightly anomalous in cobalt, copper and zinc in - 40 mesh.

Sample 821030, moderately anomalous in tungsten and uranium in - 40 mesh.

Sample 821029, slightly anomalous in zinc in -40 mesh and highly anomalous in zinc in -80 mesh.

Sample 821073, slightly anomalous in tin, chromium, cobalt and gold in -40 mesh, anomalous in lead in -80 mesh

Sample 821043 slightly anomalous in chromium and cobalt in -40 mesh and gold in -80 mesh.

The following group of anomalies were in drainage from the region of the unconformable contact between Georgina Basin sediments and underlying Lower Proterozoic metamorphic rocks.
Sample 821044, anomalous in molybdenum in -80 mesh.
Sample 821039, slightly anomalous in lead, tin, gold, nickel and chromium in -40 mesh, and anomalous in molybdenum in -80 mesh.
Sample 821038, slightly anomalous in chromium in -40 mesh.
Sample 821037, slightly anomalous in copper in -40 mesh.
Sample 821048, moderately anomalous in molybdenum in -80 mesh, slightly anomalous in gold in -40 mesh.

The following group of anomalies were in drainage from alluvial cover over Lower Proterozoic metamorphic terrain.
Sample 821063, moderately anomalous in tin, uranium, chromium and copper in -40 mesh.
Sample 821103, moderately anomalous in lead in -40 mesh and cobalt in -80 mesh.
Sample 821097, moderately anomalous in copper and nickel in -40 mesh and chromium, cobalt and zinc in -80 mesh.
Sample 821096, slightly anomalous in zinc in -40 mesh.

The following group of anomalies were from drainage off poorly exposed metamorphic terrain.
Sample 821049, anomalous in gold and molybdenum in -80 mesh.
Sample 821050, anomalous in gold in -80 mesh and highly anomalous in tungsten in -40 mesh.
Sample 821051, anomalous in tin in -40 mesh.
Sample 821052, slightly anomalous in tin in -40 mesh and gold in -80 and -40 mesh.

4.2 Geochemical Follow-up

Follow-up on identified geochemical drainage anomalies was carried out in August - September 1981. Access for recovery of original sites and detailed sampling in head water drainage was gained by four-wheel drive and foot traverse. Standard sample collection

techniques as employed in the original survey were used. The -80 mesh and -40 mesh fractions were forwarded to AMDEL as in the original survey. Panned concentrates were taken where tin, tungste or gold anomalies were being followed-up. For this purpose -4mm gravel samples of average weight 15 kg were collected from trap site gravels and panned-down at the base camp. Panned residues of approximately 50gm were despatched for analysis for tin, tungsten, gold, niobium and tantalum.

Follow-up on sample 821035 was not completed.
Follow-up on sample 821034 comprised a repeat sample and panned concentrate from a site 500m upstream (969578). The cobalt anomalous value was not repeated; gold reported only 0.10 ppm in the panned concentrate. No further follow-up is planned.
Follow-up on sample 821031 comprised a repeat sample from 400m upstream (969580). The anomalous cobalt, copper and zinc values were not repeated and no further follow-up is planned.
Follow-up on sample 821030 comprised a repeat sample and panned concentrate from the same site (969581). The anomalous uranium and tungsten values were not repeated.
Follow-up on sample 821029 comprised a repeat sample from the same site (969582). Anomalous zinc values were not repeated. No further follow-up is planned.
Follow-up on sample 821073 comprised a repeat sample from the same site (969583). Anomalous lead, chromium, tin, gold and cobalt values were not repeated. No further follow-up is planned.
Follow-up on sample 821043 comprised a repeat sample and a panned concentrate from the same site (969584). Anomalous chromium and cobalt values were not repeated. Gold reported less than 0.05 ppm in the panned concentrate. No further follow-up is planned.
The original anomalies from drainage off Palaeozoic sediments were not repeated and seem to represent a series of spurious values from geochemical analysis.

Follow-up on sample 821044 and 821039 comprised three samples and two panned concentrates from headwaters of the catchment. (969588, 969589, 969590) anomalous values in lead, tin, gold, nickel, chromium and molybdenum were not repeated or upgraded in tributarie Gold and tin reported less than 0.05 ppm and less than 10 ppm respectively in panned concentrates. No further follow-up is planned.

Follow-up on sample 821038 comprised a repeat sample (969592) and a further sample (969591) collected 1 km upstream. The anomalous chromium value did not repeat. No further follow-up is planned.

Follow-up on sample 821037 comprised a repeat sample (969593) and a further sample (969594) collected 800 m upstream. The anomalous copper value did not upgrade. No further follow-up is planned.

Follow-up on sample 821048 has not been completed.

Follow-up on sample 821063 comprised a further two samples with panned concentrates collected 1200 and 2500 m upstream (969585 and 969586). Anomalous tin, uranium, chromium and copper values were not repeated, tin reported only 20 and 30 ppm in panned concentrates No further follow-up is planned.

Follow-up on samples 821103, 821097 and 821096 took place in drainage within EL 2960.

Follow-up on sample 821049 was not completed.

Follow-up on sample 821050 comprised a repeat sample with panned concentrates at the original site (969577). Anomalous gold and tungsten values did not repeat. Tungsten reported only 16 ppm in the panned concentrate. Gold reported 4.3 ppm in the panned concentrate and was further followed-up by two panned concentrates from the best available trapsites in the stream. (969972, 969973) Gold reported less than 0.01 ppm by fire assay method in both samples. No further follow-up is planned. Moderately anomalous copper values reporting in follow-up sample 969973 were followed up within EL 2960.

Follow-up on 821051 comprised a repeat sample with pan concentrate from the same site (969576). The anomalous tin value was repeated

but tin only reported 10 ppm in the panned concentrate. No further follow-up is planned.

Follow-up on sample 821052 comprised a repeat sample and panned concentrate from the same site (969569). Anomalous gold values did not repeat. The anomalous tin value was repeated. Gold and tin reported only 0.05 ppm and 14 ppm respectively in the panned concentrate. No further follow-up is planned.

The majority of anomalies reported in the original survey were due to spurious assay results and the difference in assay values for repeat samples being greater than the orders of magnitude of low and middle order anomalies.

5. STREAM GRAVEL SAMPLING

In conjunction with reconnaissance geochemical drainage sampling, trap site gravels were collected for observation for kimberlitic indicators. A heavy mineral (gravel) trap site was selected and dug out normally to a depth of 0.6m. The contents were screened to -4mm and two bags collected with average total weight 26 kg.

These were forwarded to CRAE, Belmont, W.A. Laboratory for processing. As a result of a large backlog of samples only two of these samples have been processed to date. Observations for kimberlitic indicators on both samples were negative. A full laboratory report is included as an appendix.

6. MINERALISED LOCALITES

Three mineralised localies pegged by Steven Kovacs and covered in the joint venture agreement were assessed.

6.1 Mineral Lease 1712H

This locality comprised a slightly elevated ridge 50m in length of podiform epidote calc-silicate within a sequence of coarse muscovite biotite schist. Intrusive pegmatite viens resulted

in a coarsening of texture over a four metre width. Minor scheelite was observed on the surface in this zone. A composite rockchip sample collected across this horizon returned slightly elevated copper and tungsten values at 580 ppm and 70 ppm respectively. The mineralised horizon was discontinuous and had no strike extension beyond 50 m. The host calc-silicate bed had a subvertical attitude with flexure and a strike of 012°. The above assay was considered representative of the mineralisation and as such the locality is not prospective on any scale.

6.2 Mineral Claim 713H

This locality showed a similar geological situation to that described above. A composite rockchip sample collected over a two metre horizon shedding scheelite returning an assay elevated in tungsten and molybdenum; 5100 ppm and 70 ppm respectively. The strike of the calc-silicate host was 0° with a 65° dip to the west and a strike extension of 30m. The returned assay was assumed to be representative of surface mineralisation and with the above exposure dimensions gives an estimate of ore reserve as low as .780 tonnes tungsten per vertical metre. Thus the prospect is of no interest to CRAE.

6.3 Mineral Lease 1031H

At this locality a quartz haematite breccia dyke hosting rich copper carbonate mineralisation was observed. Radiating clusters of specular haematite up to 3 cm across were observed in the matrix. A composite sample of material from the one costean and mullock piles returned 40.9% copper. Also of significance was an assay of 70 ppm uranium against a return of 14 ppm thorium. Total surface exposure of mineralisation was confined to a section 20m by 2m with no potential for extension. The dyke had a trend of 150° and dipped 80° to the south west. The assay was considered representative of the highly enriched surface zone and grades probably drop off rapidly with depth. No meaningfull estimate of ore reserves per vertical metre can be made, however the style

of mineralisation in a single discordant breccia dyke is not prospective for CRAE. It does indicate, along with other localiti outside the EL, significant copper within the Bonya sequence.

7. GEOLOGY

As part of a broader programme involving EL's 2960 and 1910 the area was geologically mapped at 1:50,000 scale. (see NTa 483).

Photo interpretation of 1:25,000 scale colour aerial photography and 1:50,000 black and white photography was complimented by reconnaissance traverses and correlation with better exposed sections outside the EL. Photo mapping of Lower Proterozic units was made difficult by subdued relief and somewhat homogenous photo tone. Interpretation of Lower Proterozic structure is based mainly on correlation with other areas.

7.1 Quaternary Cover

From local borehole data Quaternary cover was ascertained as predominantly alluvial sands and grits nowhere greater than 10m in thickness. Aeolian dust is a significant component in -80 mesh stream sediment and soils. Talus debris forms a considerable thickness of cover at the base of Palaeozoic sediment strike ridge escarpments.

7.2 Upper Proterozoic to Middle Cambrian Georgina Basin sediments

Georgina Basin sediments onlap with an angular unconformity against older metamorphic and igneous rocks. The sediments of the Georgina Basin are not metamorphosed and have not been intrude by igneous rocks. Minor lead and copper mineralised localities ar known from elsewhere in the basin but the sediments were not considered prospective within the Arthur Creek area.

7.3 Jinka Granite

For convenience granitiod bodies were mapped as Jinka Granite Recent mapping by the Northern Territory Geological Survey showed several discrete granitiod bodies of varying mineralogy are present in the area. Rb-Sr age determinations by Black (1980) showed the major granites were emplaced at about 1750m.y. and were followed by pegmatites at about 1660 m.y. and high-level granites about 1460 m.y. Numerous thin veins of barytes are known to occur in the Jinka Granite but these are all too small to warrent further investigation. Intrusive granitiod has in places produced contact metamorphic aueroles.

7.4 Bonya Schists

The Bonya Schists were included as Division II rocks of the Arunta Block by Shaw & Warren (1975); Shaw & Stewart, (1975) and correlated with the Warramunga Group in the Tennant Creek area. They were shown to be intruded by post tectonic granites, dated by a Rb-Sr total-rock isochron at about 1750 m.y. (Black, 1980).

Metamorphic grade is generally lower amphibolite with local retrogression to greenschist facies adjacent to the major faults (Warren, 1980). Metamorphic foliation was observed to cut across small scale isoclinal folding and in places to be absent altogether to the extent of the rock being properly termed a hornfels. Andalusite and (?) cordierite was observed showing that the metamorphic pressure was low.

The schists were distinguished by andalusite content and by proportions of micas, quartz and general texture. To the south of Arthur Creek EL the schists could generally be separated by photo-tone.

In recent mapping (N.T.G.S. unpub.) the Bonya schists were assigned formational status. Informal subunits can be recognised.

Unit pЄo (1) comprises medium to coarse muscovite biotite schist with discontinuous lenses of epidote calc-silicate and quartz magnetite rock. Petrographic examination on quartz-feldspar-biotite schist collected from this unit outside the Arthur Creek E suggested derivation from an acid volcanic rock such as rhyodacite Stratabound mineralisation on M.L. 1712H and M.C. 713H and discordant mineralisation on M.L. 1031 map within the unit. Outsi the EL it hosts copper and tungsten mineralisation at numerous localities notably White Violet, Ultra Violet, Bonya and Xanten workings. These localities are associated with calc-silicate horizons except Bonya which occurs as a discordant quartz haematit copper carbonate breccia reef.

Unit pЄo (2) comprises monotonous iron-stained medium to coarse muscovite, biotite and andalusite schists. Andalusite content varies considerable and in the Arthur Creek EL is generally subordinate. Metamorphic crenulation was observed as characteristic in places. The unit does not host carbonate or volcanic rocks of syngenetic association but rare small gabbroic intrusives were observed. No mineralisation was observed anywhere and the unit wa not considered prospective.

Unit pЄo (3) comprises fine crystalline muscovite, biotite, sericit $\pm$ andalusite schist. Dark grey clots of biotite up to 3mm in diameter were characteristically observed on a light grey fissile matrix. The unit contained significant lensoid bodies of laminated epidote calc-silicate and marble notably in consistent horizons towards the base. Individual lenses may be up to 500m in strike length by 20m thick. Bodies of fine to medium crystalline amphibolite of similar dimension were observed often associated with the calc-silicates. Other associated lithologies of smaller outcrop extent include quartz magnetite rock and quartz haematite magnetite rock interpreted as banded iron formation on phosphate content (Mike Freeman N.T.G.S. pers. comm). Unit pЄo (3) has been correlated with the host unit at the Jervois ore body, and else-

where hosts numerous copper and tungsten mineralised localities notably the Damascus and Jericho workings. These localities are consistently associated with calc-silicate horizons.

Unit pЄo (4) comprises laminated argillaceous and calcareous meta-pelite grading into fine crystalline muscovite biotite schist Metamorphic fabric is often absent and where close to granite contacts the rock appears to have taken on a coasened granular texture. In these areas the rock was described as hornfels. Strataform horizons of epidote calc-silicate and fine to medium crystalline amphibolite were observed within the unit. Authigenic magnetite and tourmaline were observed as accessories in a petrographic sample collected outside the EL. No mineralisation was observed within this unit.

7.5 Mascotte Gneiss Complex

The Mascotte Gneiss Complex was afforded formational status by recent N.T.G.S. mapping. It is structurally complex and characteristically contains numerous felstic segregations and intrusives; within Arthur Creek EL granitised gneiss and felsic intrusives account for about half the exposures. Indications were that the Mascotte Gneiss Complex had a history involving more than one phase of metamorphism and was unconformable beneath and basement for the Bonya Schists. No mineralisation was observed within the Mascotte Gneiss Complex.

8. DISCUSSION

From the above observations two units, pЄo (1) and pЄo (2) within the Bonya Schists were considered prospective horizons. Geochemical drainage techniques failed to deliniate anomalous areas within the Arthur Creek EL but the technique was successful in the adjacent EL to the south, EL 2960 Bonya Bore. Known mineralised localities were identified by drainage geochemistry and also the propective units in a

general way. The anomalies were subsequently followed-up to headwater catchments in areas of previously unworked and unrecorded mineralisation. Follow-up continues.

As more data becomes available from geological follow-up in the Bonya Bore EL potential orebodies and subsurface extensions within the prospective units may become apparent.

9. REFERENCES

Black, L.P., 1980 — RB-Sr geochronology of the Jervois area in the eastern part of the Arunta Block, N.T. BMR. Jour. Geol. & Geophys. 5, 265-70

Shaw, R.D. & Stewart, A.J. 1975 — Arunta Block - regional geology. In Knight, C.L. (editor) - Economic Geology of Australia and Papua New Guinea: 1. Metals. Aus. I.M.M. Monograph 5, 437-42

Shaw, R.D. & Warren, R.G. 1975 — Alcoota, Northern Territory - 1:250,000 Geological series Explanatory Notes. Bur. Miner.

Smith, K.G. 1963 — Huckitta, Northern Territory - 1:250,000 Geological map sheet and Explanatory Notes. Bur. Miner.

Warren, R.G. 1980 — The Arunta Block in the Huckitta 1:250,000 sheet area : a review of data to June 1980. Bur. Miner. Rec. 1980/45

10. KEYWORDS

assays - geochem - drainage, amphibolite, barite, B.I.F., calc-silicat copper, enrichment, epidote, geochem-rock, igneous, metamorphic, ° Palaeozoic, petrography, photogeology, Proterozoic-Lr, Proterozoic-Up, quartz-magnetite, sediments, stratabound tourmaline, unconformity.

11. LOCALITY

Huckitta SF/53-11

12. LIST OF PLANS

Plan No	Title	Scale
NTa 474	Geochemical Sample Location Plan	1:50,000
NTa 475	Assay Results-Pb, Zn, Mn, Ag -80 mesh	1:50,000
NTa 476	Assay Results-Cu, Sn, W, Mo -80 mesh	1:50,000
NTa 477	Assay Results-Co, Ni, Cr -80 mesh	1:50,000
NTa 478	Assay Results-U, Th, Au -80 mesh	1:50,000
NTa 479	Assay Results-Pb, Zn, Mn, Ag -40 mesh	1:50,000
NTa 480	Assay Results-Cu, Sn, W, Mo -40 mesh	1:50,000
NTa 481	Assay Results-Co, Ni, Cr -40 mesh	1:50,000
NTa 482	Assay Results-U, Th, Au, As -40 mesh	1:50,000
NTa 483	Arthur Creek, EL 1910 Geology	1:50,000
NTa 740	Assay results (ppm) Sn, W, Au, Nb, Ta panned concentrates	1:50,000

APPENDIX I

Geochemical Reconnaissance Survey Ledgers

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

PROJECT ARUNTAS

KOYAGS EL's 1910

SAMPLE Nos. 821028 → 032

MAP OR PHOTO REFERENCE HUCKITTA 250,000 PHOTOS: 5/266 ; / ;

D.P.O. No. 21502 → 21604 (#80 → #40)

DATE 12/4/80 → 7/5/80

COLLECTED BY CS, WFF, GIS, WHJ

ANALYSED BY

SHEET No. 1

Map G. Grids.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb 30	Zn 75	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	Scinto. c.p.s	Geological Observations
•	821029	70	28	2	RB		5	10	110	16	10	5	10	5	<10	6		<1	0.05	180				<4		90/115	Many small (2-5mm) rounded limestones.
27505	-60				RB																						
X	✓ -40				Br			9	20	12	15	25	10	1	<10	4	<2	<1	005	180				<4			
P2	+ +40				Br																						
																										105/120	Good Grap. High % Fe'stns. Bed load is mixed Paleozoic & minor epidosite, calc silicates. Marked colour change -30 → -60±
•	821030	70	30	<1	RB		80	10	20	18	15	10	10	6	<10	8		<1	0.05	270				<4			
27515	-60				B																						
	✓ -40				B			8	18	12	15	30	20	1	30	<4	9	<1	0.05	220				22			
P2	+40				B																						
•	821031	50	49	1	BR		6	5	32	14	10	10	10	7	<10	6		<1	<0.05	280				4		80/95	Fe'stn & calk. Outcrop of siliceous Fe'stn noted.
27505	-60				BR																						
	✓ -40				DBr			13	40	22	25	35	20	1	<10	<4	3	<1	0.05	400				<4			
P2	+40				DBr																						
•	821032	50	50	/	RB		90	5	24	16	10	10	10	6	<10	8		<1	0.05	210				4		100/165	Angular xtals in bed, minor Fe'stn. Bed load & mixed Paleozoic s'stns good mica schist
27504	-60				RB																						
	✓ -40				Br			5	12	12	15	25	20	1	<10	<4	<2	<1	0.10	100				<4			
P2	+40				YBr																						

Relative

#80, -#40, -#40

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

PROJECT - ARUNTAS

L. KOVACS E.J's 1910

SAMPLE Nos. 821033 - 037

MAP OR PHOTO REFERENCE - HUCKITTA 1:250,000 PHOTOS: 5/266, 5/268

D.P.O. No. 21502, 21601, 21604

DATE 18/4/80, 6-7/5/80

COLLECTED BY CS, WJF, WHJ, GES

ANALYSED BY ANDEL

SHEET No. 2

M.G. Grid Co-ords.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	Scinto. c.p.s	Geological Observations
6 •	-80 821033	30	70	<1	RB		75	10	14	6	5	5	10	8	<10	6		<1	0.05	110				4		210/230	Trap in subcrop boulders of Fe'Stn. Fe'Stn in vuggy, stalagtitic and siliceous. Rock chip taken across subcrop. Bed load of mixed Paleozoic mica s'Stn + epidosite 2%, QTZ 3%. Much Fe'Stn
731504	-60				P-RB																						
X	✓ -40				M			8	8	8	10	25	10	2	20	<4	2	<1	0.10	110				6			
P3.	+40				M																						
5 •	-80 821034	50	50	<1	RB		10	5	22	14	10	10	10	9	<10	<4		<1	0.05	160				<4		90/140	Outcrop of L'Stn in creek. Paleozoic bedrock.
731503	-60				RB																						
X	✓ -40				RB			8	18	14	15	35	20	3	15	<4	2	<1	0.05	160				<4			
P2.	+40				YB																						
6 •	-80 821035	30	70	<1	RB		20	15	16	12	10	10	10	8	<10	6		<1	0.15	110				4		170/230	Paleozoic s'Stns + mica schist
731503	-60				B																						
X	-40				YBr			6	16	14	20	30	20	2	<10	6	<2	<1	0.05	110				6			
P2.	+40				YBr																						
8 •	-80 821037	60	40	20	RB		3	15	14	8	10	10	10	7	<10	4		<1	<0.05	140				12		420	Trap in amphibolite bar. High magnetite component. Amphibolite, coarse pelitic migmatite? ± magnetite blebs.
731507	-60				RB																						
X	✓ -40				Gr			19	32	20	15	20	10	<1	<10	8	3	1	<0.05	450				6			
A2	+40				Gr																						

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

#80 -#40, -#40

PROJECT ARUNTAS

D.P.O. No. 21502, 21601, 21604

DATE 18/4/80 6-7/5/80

SHEET No. 3

L. KOVACS EL'o 1910.

SAMPLE Nos. 821038 — 044

COLLECTED BY CS, WHI, GIS

MAP OR PHOTO REFERENCE HUCKITTA 250,000. PHOTO 5/268

ANALYSED BY AMDEL

A.M.G. Grid Co-ords.	Sample Number	Sediment				Sample		Metal Content, p.p.m.																	Scinto.	Geological Observations
		Gravel	Sand	Silt/Mud	Organic	Flow	Width	Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	c.p.s	
8 •	821038 -80	40	59	1	RB		4	20	20	12	15	10	10	6	<10	4		<1	0.05	150				4		30/380	Gneiss o/c 20m downstream bedload of
4757507	-60				Br																					grain + short, tourmaline qtz.
X	✓ -40				Gr			20	28	18	30	15	30	1	<10	<4	12	2	0.05	290				6			
√A2.	+40				Br																						
68 •	821039 -80	30	69	1	RB		15	10	14	10	10	5	<10	7	<10	8		<1	0.05	120				4		120	Mostly Paleozoic bedload ± some minor pegmatite
4757507	-60				BR																						+ amphibolite. Rounded alluvium. Slight aeolian
X	✓ -40				B			40	30	12	10	10	10	1	<10	12	14	1	0.10	380				<4			augment in -90#
√A2	+40				Brk Br.																						
88 •	821040 -70	70	30	<1	R		5	5	18	8	10	10	10	8	<10	12		<1	<0.05	240				<4		95/150	Mixed Paleozoic Sstn and schist bedload. Marked
4747007	-60				RB																						colour change between -80# and -60#
X	✓ -40				RB			5	22	10	10	10	10	<1	<10	<4	4	1	<0.05	280				<4			
√P2.	+40				QZ																						
268 •	821043	80	20	<1	RB		20	5	18	4	5	5	<10	5	<10	6		<1	<0.05	130				4		60	Paleozoic bedload of limestone + micaceous Sstn
4733509	-60				B																						Very low -60# frac.
√X	✓ -90				B			10	12	12	20	30	20	2	<10	<4	2	<1	0.10	280				<4			
P2.	+90				B																						
88 ✓	821044 -80	70	29	1	R		30	5	20	6	5	5	<10	9	<10	<4		<1	<0.05	140				4		120/Ps	Subcrop of Fe'Sstn over 3m Mostly Paleozoic
4757510	-10				RB																						bedload ± minor schist. Marked colour
XA2.	✓ -90				RB			7	24	12	10	10	10	<1	<10	6	2	1	<0.05	200				4			contrast -90#/-60#
	+90				YB																						

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

#80 -#40

PROJECT BRUNTAS

KOUACE E.G's 1910

SAMPLE Nos. 921063, 921045-048

D.P.O. No. 21502, 21601

DATE 18/4/80, 6/5/80

SHEET No. 4

MAP OR PHOTO REFERENCE Huckitta 250,000 PHOTO 6/070, 6/072

COLLECTED BY WJF, CS

ANALYSED BY AMDEL

M G Id words.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	U	Th	Scinto. c.p.s	Geological Observations
•	921063 -10	15	84	1	Drk		30	5	14	16	10	5	10	3	10	10		<1	<0.05	160	4		99/170	Float ss, qtz, qtzite, gnss, tourm peg, amphibolite, granitoid.
1510	-60				Brk																			
X	✓ -40							15	34	22	10	25	20	1	<10	<4	3	2	<0.05	430	14			
A2.	+40																							
✓	921045 -60	45	55	4	MB		8	5	12	4	5	5	10	8	<10	4		<1	0.10	100	<4			
21504	-40				DRB																			
P2.	✓ -40				Cngl			7	32	8	10	15	10	<1	<10	6	5	1	0.10	300	4			
	+40				Cngl																			
X	921046 -70	55	45		RB		5	12	22	14	5	15	10	6	<10	<4	<2	1	<0.05	170	4		110	Mafic Gneiss, Calcsilicate, Calc-Silicate, QTZ, Epidote, QTZ-Epidote, Mafic Gneiss o/c
21505	-60				B																			
X	✓ -40				Cngl			10	55	20	20	25	10	1	<10	<4	<2	1	<0.05	510	6			
A2.	+40				Cngl																			Felt, QTZ, Mag, Musc.
X	921047 -60	40	60	<1	MB		10	10	20	16	15	20	20	7	<10	8	<2	1	<0.05	200	8		20/120	Mafic Gneiss, K Granite, Epidosite-Mag rock.
21506	-60				RB																			Much mag as fines. Mafic Gneiss o/c
X	✓ -40				B			4	38	28	25	25	10	1	<10	<4	3	1	0.05	360	<4			
A2.	+40				Cngl																			QTZ, Felt, Mag, Musc.

#80, -#40 -#40

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

PROJECT ARUNTAS

EL. KOVACS EL. 1910

MAP OR PHOTO REFERENCE HUCKITTA 6/072, 5/270

SAMPLE Nos. 821050 — 053 / 821073

D.P.O. No. 21502, 21601, 21604

DATE 18/4/80, 6-7/5/80

COLLECTED BY CE, WJF

ANALYSED BY AMDEL

SHEET No. 5

AMG Grid Co-ords.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	Scinto. c.p.s	Geological Observations
2 •	821050	23	77	<1	RD		7	10	12	12	10	10	10	<1	<10	4		<1	0.1	110				4		169/185	Chlorite Musc. Schist, QTZ Biotite QTZite, Potassic
11505	-60				B																						
X	✓ -40				B			3	24	22	20	15	10	<1	1900	<4	<2	1	0.05	210				<4			Granite
A2.	+40				Grey Br.																						
•	821051	15	84	1	RD		12	<5	14	10	10	10	20	2	<10	6		<1	<0.05	100				<4		150	QTZ, QTZite, Granite.
11505	-60				PALE RD																						
X	✓ -40							8	24	20	15	15	20	1	<10	16	3	1	0.05	190				8			
A2.	+40																										QTZ, Feld, QMS., MUSC
•	821052	32	69	<1	Grey RD		4-10	<5	14	10	10	10	10	1	<10	10		<1	0.10	130				<4		160/180	Tourmaline QTZ, Potassic Granite, Chlorite
11505	-60				BR																						Mica Schist, Biotite QTZite.
X	✓ -40				BR			4	24	16	15	15	10	1	<10	12	<2	1	0.10	200				<4			
A2	+40				B																						
•	821053	10-15	84	1	PRR		6-10	<5	10	8	5	5	10	4	<10	4		<1	<0.05	90				4		250	QTZ, QTZite, QMS, Granite, Feld.
1406	-60				PRR																						
X	✓ -40				Pale RD			3	24	18	10	15	10	<1	10	4	4	1	<0.05	120				<4			
A2	+40				Pale RD																					→	QTZ, MUSC, Tourm, FELD., Biotite.
•	821073	50	50	<1	Pale Br		10	25	20	10	5	10	10	3	<10	4		<1	<0.05	200				6		85	S'Stn.
21010	-60				Grey Br																						
1X	✓ -40				Grey			8	26	16	15	30	20	3	<10	<4	5	<1	0.15	360				<4			
P2.	+40				Grey																			1			Polarysis S'Stn.

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

#80, -#40 -#40

PROJECT - AZUNTAS

D.P.O. No. 21502, 21601, 21604

DATE 18-2-80, 6-3/3/80

SHEET No. 6

L. KORVACS 1910

SAMPLE Nos. - 321 074 - 078

COLLECTED BY - CS, WJF

MAP OR PHOTO REFERENCE - Huckitta -250,000: Run 5/270

ANALYSED BY - AMDEL

AMG Grid Co-ords.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	Scinto. c.p.s	Geological Observations
•	321074 -70	10	89	1	RB		15	10	12	4	10	<5	10	6	<10	8		<1	<0.05	90				4		100/125	QTZITE, QTZ S'Stn, MICA. SCHIST
1511	-60				YB																						
X	✓ -40				YB			8	30	12	10	15	<10	<1	<10	<4	<2	1	<0.05	150				6			
P2	+40																										QTZ, FELD, BIOTITE, S'Stn.
•	321075 -80	20	69	1	RB		20-50	10	14	6	10	5	10	3	10	10		<1	<0.05	110				4		90/105	S'Stn, QTZITE
317332	-60				Mole RB																						
X	✓ -40				YB			12	28	12	10	15	10	<1	10	<4	2	<1	0.05	240				6			
P2.	+40																										QTZ, FELD, BIOTITE, TOURM, S'Stn
X	321078 -70	25	79	RS	5-20			16	20	12	10	15	10	5	<10	6	<2	1	<0.05	180				6			
307508	-60			B																							
X	✓ -40			Lt Br.				3	34	14	20	25	10	3	<10	<4	9	1	0.05	350				10			QTZ, GNEISS, MAFIC SCHIST, QTZITE, Peg.
A2.	+40																										O/C of QTZ-MUSC GNEISS
																											QTZ, FELD, MUSC, BIOTITE, AMPHIBOLE
X	321079 -50	20	79	1	RB		10-15	12	20	12	10	15	10	1	10	<4	2	1	<0.05	140				4			QTZ, MUSC. GNEISS, PEG., AMPHIBOLITE, GRANITOID
307509	-60				B																						MAFIC GNEISS. O/C OF COARSE QTZ-MUSC-GRANT.
X	✓ -40				B			13	40	18	20	20	10	3	<10	<4	<2	1	0.05	300				4			GNEISS.
A2.	+40				Grey																						QTZ, FELD, MUSC, TOURM.
X	321103 -80	25	79	1	Dark RB		15-20	12	16	8	10	20	10	3	<10	<4	4	<1	<0.05	120				8			GNEISS, GRANULITE, QTZ-TOURM-PEG, QM GNEISS,
315.0	-60				Dr																						GRANITE, CONCRETE, EPIDOSITE
X	✓ -40				Mole Dr			22	22	8	10	15	10	1	<10	<4	2	1	<0.05	310				8			
A2.	+40																										QTZ, FELD, MICS., AMPHIB, BIOTITE, TOURM.

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

OJECT Arunta

Kovacs EL 1910

P OR PHOTO REFERENCE Hackett Run 7/166

SAMPLE Nos. 821127, 049

\#80 -#40

D.P.O. No. 21504, 21604   21502, 049, -80°

DATE 29-4-80, 7/5/80

COLLECTED BY WTF, CS

ANALYSED BY AMDEL

SHEET No. 10

M G -ords.	Sample Number	Sediment: Gravel	Sand	Silt/Mud	Organic	Sample: Flow	Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	Scinto. c.p.s	Geological Observations
•	-80 821049	30	69	1	PKB		5	<5	16	16	10	10	10	11	<10	6		<1	0.15	130				4		130	O/C: Granite
77503	-60				KB																						+40: qtz, fld, musc, biotite
X	-40				YB			2	16	8	5	10	10	<1	<10	10	2	1	0.10	140				<4			
A2.	+40																										

APPENDIX II

Geochemical Follow-up Ledgers

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. No. 21692 / 21694

DATE 7-10-81

SHEET No. _____

OJECT ARUNTA REG

Arthur Creek

SAMPLE Nos. _____

COLLECTED BY BEN

ANALYSED BY AMDEL

P OR PHOTO REFERENCE Hutchilla Run 6 Photo 072

M.G. rid o-ords.	Sample Number	Sediment				Sample		Metal Content, p.p.m.																	Scinto.	Geological Observations
		Gravel	Sand	Silt/Mud	Organic	Flow	Width	Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	c.p.s	
	969972	50	50	<5		Hi-Mil	-40#	5	22	26	20	10	10	1	<10	10		<1	<0.01	170				6	28		Collected for Pan conc.
	G	Good trap site. Pan Conc.																	<0.01								Back bar gravel trap.
	969973	50	50	<5		Hi-Mil	-40#	10	22	30	15	20	20	1	15	12		<1	<0.01	240				6	38		Collected for Pan Conc
	G	Good trap site. Pan Conc.																	<0.01								Gravel bar trap site.

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL ROCK CHIP SAMPLING LEDGER

PROJECT ARUNTA

E.L. Arthur Creek 1910

MAP OR PHOTO REFERENCE Heavitree Bore 6 Photo 070

* gr – grab
co – composite
ch – channel

SAMPLE Nos. 969511 - 969513

D.P.O. No. 21674

DATE 3-9-81

COLLECTED BY BEH

ANALYSED BY AMDEL

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				U	Th	Scinto. c.p.s	Geological Observations
R6/070 1712H	969511	4	Co			580				2	70				<0.05					4	18	90	Alledged scheelite locality. Epidote calc-silicate invaded by Pegm. Discontinuous nature trending 012°, 50m along ridge. Coarse Musc schist in vicinity
R6/070 713H	969512	50 x 2	Co			190				75	5100				<0.05					6	20		Scheelite prospect Pegm thro' epidote calc silicate, scheelite scattered on surface 30m x 2m trend 0°, dip 65° W. Alledged flourite in local.
R6/070 1031	969513	20 x 2	Co			4098				4	15				0.10					70	14		Cu, qtz haematite breccia dyke. trending 150° dip 80° SW. Coarse xtalline specular haematite in qtz vienlg

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. No. 21678 21679

DATE 3-9-81

SHEET No.

PROJECT ARUNTA REG.

SAMPLE Nos. 969569 969576-578

COLLECTED BY SEH

L. Arthur Ck 1910

MAP OR PHOTO REFERENCE Huckitta Run 6 Photo 072 Run 5 Photo 266

ANALYSED BY AMDEL

A.M.G. Grid Co-ords.	Sample Number	Sediment: Gravel	Sediment: Sand	Sediment: Silt/Mud	Sediment: Organic	Sample: Flow	Sample: Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	Nb	Ta		U	Th	Scinto. c.p.s	Geological Observations
R6/072	969569	15	80	5	6	Nil	S x1	15	14	16	15	5	10	1	<10	6		<1	<0.05	180				4	32	120	Float: Felsic gneiss, banded amphibolite, Musc schist, amphibolite, utzite
	-60				b																						
	-40				b			5	26	22	20	10	10	<1	<10	14		<1	<0.05	230				6	28		Peg vn, Andalusite sericite schist
	+40				b																						Epidote calc-silicate Qtz tourmaline rock
	G	Good - Mod Site													<10	14			0.05		22	<10					No o/c
R6/072	969576	20	75	5	6	Nil	S x2	5	14	18	15	5	10	2	<10	8		<1	<0.05	160				4	18	180	Float: SA-SR Felsic gneiss, Qtz tourmaline breccia, Musc schist, Andalusite sericite
	-60				b																						schist, Qtz tourmaline rock, utzite
	-40				b			<5	20	20	25	10	10	1	<10	8		<1	0.05	190				4	28		c/c Felsic gneiss a granite - utzite
	+40				16																						(280 cps)
	G	Mod Site													10	10			<0.05		55	40					
R6/072	969577	25	70	5	6	Nil	S x2	5	10	16	15	5	10	1	<10	10		<1	<0.05	140				4	26	140	Float SA-SR Andalusite sericite schist
	-60				b																						Pink granite, Felsic gneiss, utzite
	-40				b			<5	20	22	25	10	10	<1	<10	14		<1	<0.05	220				6	22		Qtz tourmaline rock, Amphibolite
	+40				b																						Calcrete, epidote calc silicate.
	G	Poor - Mod													30	16			4.30		48	110					No o/c.
R5/266	969578	70	25	5	6	Nil - Hi	10 x1	10	18	12	15	<5	<10	2	<10	10		<1	<0.05	150				<4	16	40	Float SA - SR Georgina Basin Sand.
	-60				b																						No O/c.
	-40				b			5	24	12	15	5	<10	1	<10	10		<1	<0.05	190				4	12		
	+40				b																						
	G	Poor - Mod													<10	<10			0.10		14	<10					

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

PROJECT ARUNTA REG. D.P.O. No. 21678 - 21679

E.L. Arthur Ck. 1910 DATE 3-9-81

SAMPLE Nos. 969579 - 969583 COLLECTED BY B.E.H. SHEET No.

MAP OR PHOTO REFERENCE Hudiba Run 5 Photos 266 - 270 ANALYSED BY AMDEL

A.M.G. Grid Co-ords.	Sample Number	Sediment: Gravel	Sand	Silt/Mud	Organic	Sample: Flow	Width	Metal Content, p.p.m.: Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	Nb	Ta		U	Th	Scinto. c.p.s	Geological Observations
RS/266	969579	65	30	5	b	Hi Md	5 x1	5	12	8	10	<5	<10	1	<10	8		<1	<0.05	130				<4	14	60	Float: SA-SR Georgina Basin Sands
	-60				b																						No O/C.
	-40				b			5	20	10	15	5	<10	1	<10	12		<1	<0.05	210				<4	10		
	+40				b																						
RS/266	969580	70	25	5	b	Md -Hi	20 x1	10	8	8	10	<5	<10	2	<10	8		<1	<0.05	110				<4	12	60	Float: SA-SR Georgina Basin Sands.
	-60				b																						Fe-stone. No O/C.
	-40				b			10	28	12	15	10	<10	1	<10	4		<1	<0.05	320				<4	12		
	+40				b																						
RS/266	969581	20	75	5	b	Md	50 x4	10	18	12	10	5	<10	1	<10	6		<1	<0.05	180				4	28	110.	Float: SA-SR Georgina Basin Sands
	-60				b																						Abundant Qtz haematite breccia (+ Mn?)
	-40				b			10	14	8	10	5	<10	1	10	6		<1	<0.05	190				4	75		Qtz tourmaline rock, Calcrete, Epidote calcrete
	+40				b																						Qtz Feld Musc Peg vn, Amph. bolite.
	G														30	4			<0.05		85	<10					No O/C.
RS/266	969582	50	45	5	b	Md	10 x8	10	26	14	15	10	<10	1	<10	6		<1	<0.05	240				4	16	70	Float: SA-SR Georgina Basin sands
	-60				b																						No O/C.
	-40				b			10	36	12	15	5	<10	1	<10	8		<1	<0.05	320				<4	12		
	+40				b																						
	G																										
RS/270	969583	65	30	5	b	Md	10 x1	10	22	12	10	5	<10	1	<10	4		<1	<0.05	200				<4	12	50	Float: SA Flaggy limestone/dolomite
	-60				b																						O/C " "
	-40				b			15	36	16	15	10	<10	2	<10	6		<1	<0.05	440				<4	14		
	+40				b																						

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. No. 21678 21679

PROJECT ARUNTA REC. DATE 3-9-81

E.L. Arthur Ck 1910 SAMPLE Nos. 769584 - 769589 COLLECTED BY BEH SHEET No.

MAP OR PHOTO REFERENCE Hughes Run 5 Photo's 270 Run 6 Photo 070 ANALYSED BY AMDEL

A.M.G. Grid Co-ords.	Sample Number	Sediment				Sample		Metal Content, p.p.m.																	Scinto.	Geological Observations
		Gravel	Sand	Silt/Mud	Organic	Flow	Width	Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn	Nb	Ta		U	Th	c.p.s	
R5/220	769584	65	30	5	lb	Nil	20 x1	10	14	8	10	5	<10	1	<10	12		<1	<0.05	160				<4	16	50	Float: SA-SR Georgina Basin sods.
	-60				lb																						o/c. Floggy limestone / dolomite
	-40				lb			10	24	12	15	10	<10	<1	<10	6		<1	<0.05	370				<4	16		
	+40				lb																						
	G														25	12			<0.05		120	80					
R6/070	769585	25	70	5	rb	Nil	20 x1	10	16	10	10	5	10	1	<10	8		<1	<0.05	170				4	32	160	Float: SA-SR Vien qtz, Amphibolite,
	-60				b																						Qtz sst, Musc Fold Qtz Pegm,
	-40				b			5	28	14	20	10	10	<1	<10	6		<1	<0.05	360				8	50		Qtz tourmaline rock, Musc tourmaline schist.
	+40				lb																						Qtz haematite breccia, Fantale endo-silicate
	G	Poor - Mod sites.													20	8			<0.05		42	<10					Felsic granite / gneiss No o/c
R6/070	769586	25	70	5	rb	Nil	20 x1	5	10	8	10	5	<10	2	<10	8		<1	<0.05	130				<4	12	120	Float: SA-SR. Vien qtz, Amphibolite,
	-60				b																						Pegm, Qtz tourmaline rock, Calcrete,
	-40				b			5	18	10	15	5	<10	<1	<10	<4		<1	<0.05	220				<4	16		Felsic gneiss, Qtz haematite breccia
	+40				lb																						o/c. Qtz Fold Musc Pegm 90 cps.
	G	Mod - Good sites.													30	<4			<0.05		110	50					
R6/070	769588	50	45	5	rb	Nil	10 x1	10	14	8	10	5	10	<1	<10	8		<1	<0.05	130				<4	24	110	Float: SA. Vien qtz, Georgina Basin
	-60				db																						sediments, Qtz Fold Musc Pegm.
	-40				db			15	28	14	30	15	70	1	10	<4		<1	<0.05	330				12	160		No o/c.
	+40				lb																						
	G	Mod - poor sites.													<10	6			<0.05		16	<10					
R6/070	769589	50	45	5	rb	Mod -Hi	20 x1	10	12	8	5	<5	10	1	<10	6		<1	<0.05	180				<4	18	100	Float: SA-SR Georgina Basin Sods,
	-60				db																						Amphibolite - Meta gneiss, Qtz Fold Musc Pegm
	-40				db			20	36	12	20	10	10	1	<10	4		<1	<0.05	540				<4	22		Felsic gneiss, Qtz Fold Musc Granite.
	+40				b																						
	G	Good - Mod.													<10	<4			<0.05		18	<10					

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. No. 21678 21679

PROJECT ARUNTA REG.

DATE 3-9-81

SHEET No.

E.L. Arthur Ck. 1910

SAMPLE Nos. 969590

COLLECTED BY B.E.H.

MAP OR PHOTO REFERENCE Arabitta Run 6 Photo 070

ANALYSED BY AMDEL

A.M.G. Grid Co-ords.	Sample Number	Sediment				Sample		Metal Content, p.p.m.																	Scinto.	Geological Observations
		Gravel	Sand	Silt/Mud	Organic	Flow	Width	Pb	Zn	Cu	Ni	Co	Cr	Mo	W	Sn	As	Ag	Au	Mn				U	Th	c.p.s
R4/070	969590	<1	50	50	b	lo	20 x2	10	12	10	10	10	<10	2	<10	6		<1	0.05	160				4	22	140	Float: Grit. (Snail damage)
	-60				b																						vein qtz, mica, mafic silicates.
	-40				b			10	36	22	20	5	10	1	<10	12		<1	<0.05	290				4	90		
	+40				b																						
R6/070	969591	35	60	5	b	Md	20 x2	15	20	16	15	5	10	1	<10	6		<1	<0.05	200				6	65	160	Float: SA-SR. Georgina Basin Sediments
	-60				b																						Granite, Peg vn (± tourmaline) vein qtz.
	-40				b			15	26	16	20	10	10	1	<10	14		<1	<0.05	310				8	100		o/c. Pink coarse qtz fold Musc granite.
	+40				b																						(280 cps)
R6/070	969592	45	50	5	b	Md -Hi	15 x2	10	14	14	10	5	<10	1	<10	10		<1	<0.05	140				<4	24	300	Float: SA-SR. Georgina Basin Sediments
	-60				b																						Qtz fold Musc granite, Peg vn (± tourmaline)
	-40				b			10	22	18	20	10	10	<1	<10	8		<1	<0.05	250				<4	46		vein qtz
	+40				b																						o/c. See 969591. (120 cps)
R4/070	969593	45	50	5	b	Md -Hi	20 x1	15	18	12	10	5	10	2	<10	6		<1	<0.05	150				4	60	260	Float: SA-SR Amphibolite (coarse chlorite)
	-60				b																						Georgina basin sediments, qtz haematite
	-40				b			15	32	16	20	10	<10	<1	<10	4		<1	<0.05	320				6	75		breccia, epidote calc-silicate.
	+40				b																						Qtz fold Musc tourmaline Granite ± Peg vn
																											Silcrete i.e. Also o/c.
R6/070	969594	45	50	5	b	Md -Hi	20 x2	20	14	10	10	5	10	2	<10	6		<1	<0.05	170				10	140	300	Float: SA-SR Granite, Peg vn,
	-60				b																						Georgina Basin sands, Qtz haematite breccia
	-40				b			20	32	16	20	10	10	1	<10	8		<1	<0.05	370				10	130		Musc schist, Mafic gneiss, Felsic gneiss.
	+40				b																						Calcrete.
																											o/c See 969591.

APPENDIX III

Heavy Mineral Ledgers

KIMBERLITIC INDICATORS

** STATE : NT **
PERIOD 16/ 2/81 TO 20/ 2/81

** STATE : NT **
RUN ON: 24-FEB-81 09:40:33

DFO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS--- RECD	OBSVD	RESULTS
21619	36.791/4015F	HUCKITTA	821030	/ G	22.7	0.403	NEGATIVE

PAGE: 10

KIMBERLITIC INDICATORS

** STATE : NT **
PERIOD 16/ 2/81 TO 20/ 2/81

** STATE : NT **
RUN ON: 24-FEB-81 09:40:33

DFO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS--- RECD	OBSVD	RESULTS
21619	36.791/4015F	HUCKITTA	821075	/ G	27.6	0.086	NEGATIVE

Other Minerals

** STATE : NT **
PERIOD 16/ 2/81 TO 20/ 2/81

** STATE : NT **
RUN ON: 24-FEB-81 09:48:33

DPO	COST CODE	AREA	SAMPLE NO	TYPE	--WEIGHTS--- RECD	ONSVD	RESULTS
21619	36.791/4015F	HUCKITTA	821075	G			S:AMPHIBOLE F:ANDALUSITE F:BIOTITE F:CLINOZOISITE S:EPIDOTE F:GARNET F:HEMATITE F:ILMENITE F:KYANITE C:LIMONITE F:MARTITE F:MONAZITE F:MUSCOVITE F:QUARTZ F:RUTILE F:SILLIMANITE A:TOURMALINE A:ROCK FRAGMNT
21619	36.791/4015F	HUCKITTA	821030	G			F:AMPHIBOLE S:ANDALUSITE S:EPIDOTE R:FLUORITE C:GARNET O:ILMENITE R:KYANITE F:LEUCOXENE F:LIMONITE F:MONAZITE F:RUTILE F:SILLIMANITE F:SPHENE R:STAUROLITE F:TOURMALINE F:ZIRCON

EXPLORATION PTY LIMITED

GEOCHEMICAL RESULTS

-40 MES

PROJECT:	COST CODE:	TOPO. SHEET:	DATE RECEIVED:	DATE COMPLETED:	SUBMITTED BY:	D.P.O.: P3655
REPORT No: P1	PART No:	ANALYTICAL METHODS:	Pb Zn Cu Ni Co Mn Cr Ag Mo U Sn W Ba Au Pt			

SAMPLE NO.	Pb	Zn	Cu	Ni	Co	Mn	Cr	Ag	Mo	U	Sn	W	Ba	Au	Pt
821030	10	18	5	10	<5	140	20	<1	<1	5.4					
821075	5	20	10	10	5	260	40	<1	<1	3.3					

amdel

Analysis code A1/1 Report AC 1475/82 Page 1

NBS Certificate Order P 3655 Results in ppm

Sample	Sn	W	Ba	Ta
821830 G	5	15	169	<10
821875 G	9	<10	249	<10

ANALYSIS

g/tonne

SAMPLE MARK	GOLD Au	PLATINUM Pt	SAMPLE MARK	GOLD Au	PLATINUM Pt
821 030	<0.1	<0.05			
821 075	<0.1	<0.05			

136° 00'
136° 09'
22° 35'
22° 40'
374
362
353
303
377
396
383
389
436
452
Yd Norpo Bore
Twins Bore
Yd
Yd
Yd
Coppock
821030
969581
821031
969580
821029
969582
821033
821032
969583
821073
821074
821075
821034
969578
969579
821035
821043
969584
821040
821042
969588
821039
969589
969590
969591
821038
969592
969593
821037
969594
969513
ML 1031H
969512
MC 719H
821063
969585
969586
821103
821048
821099
969511
ML 1712H
821048
821049
821051
969576
969577
969572
821053
969569
821052
969573
821097
821096

C R A EXPLORATION PTY LIMITED

ARTHUR CREEK - EL 1910

1:50,000 Scale

SAMPLE LOCATION PLAN

Reference SF-53 11		
Drawn BEH	1:50,000	10994
Traced	Date SEPT 1980	NTa 474

CR 82/066.

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

383

389

396

377

305

456

482

Yd O Norpo Bor

Yd O

Twins Bore Yd

Eur

Coppock

Pb
Zn
Mn
Ag

C R A EXPLORATION PTY LIMITED

ARTHUR CREEK - EL 1910

1:50,000 Scale

GEOCHEMICAL DRAINAGE

ASSAY RESULTS - 80# Pb Zn Mn Ag (ppm)

Reference SF-53 11		
Drawn BEH	1:50,000	10994
Traced	Date SEPT. 1980	NTa 475

CR82/066

136°00'

136°9'

22° 35'

22° 40'

374

362

353

505

377

396

383

389

456

452

Norda Bore

Twins Bore

Coppocks

C R A EXPLORATION PTY LIMITED		
ARTHUR CREEK - EL 1910 1:50,000 Scale GEOCHEMICAL DRAINAGE ASSAY RESULTS -80# Cu, Sn, W, Mo (ppm)		
Reference SF-53 11		
Geologist BEH	1:50,000	Report No. 10994
Drawn	Date SEPT. 1980	Plan No. NTa 476

Cu
Sn
W
Mo

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

505

377

396

383

389

482

456

Yd Norpo Bore

Yd Twins Bore

Eur

Yd

Coppocks

Co
Ni
Cr

C R A EXPLORATION PTY LIMITED

ARTHUR CREEK - EL 1910

1:50,000 Scale

GEOCHEMICAL DRAINAGE

ASSAY RESULTS - 80# Co, Ni, Cr (ppm)

Reference SF-53 11		
Drawn BEH	Scale 1:50,000	Fig. No. 1099/4
Traced	Date SEPT 1980	Plan No. NTa 477

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

505

377

396

383

482

389

436

Yd O Norpo Bore

Yd O

Twins Bore

Yd O

Coppock

U
Th
Au

C R A EXPLORATION PTY LIMITED

ARTHUR CREEK - EL 1910

1:50,000 Scale

GEOCHEMICAL DRAINAGE

ASSAY RESULTS - 80 # U, Th, Au (ppm)

Reference SF-53 11		
Geologist BEH	Scale 1:50,000	Report No. 10994
Drawn	Date SEPT. 1980	Plan No. NT/478

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

Yd O Nordo Bore

Eur

Yd O

B

305

377

Coppock

396

Twins Bore

Yd O

383

389

436

482

450

Cu
Sn
W
Mo

C R A EXPLORATION PTY LIMITED

ARTHUR CREEK - EL 1910

1:50,000 Scale

GEOCHEMICAL DRAINAGE

ASSAY RESULTS -40# Cu, Sn, W, Mo

Reference SF-53 11		
Geologist BEH	1:50,000	10994
Drawn	Date SEPT 1980	Plan No. NT/80

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

505

377

396

383

389

482

458

Yd Norpo Bore

Twins Bore Yd

Eur

Yd O

Coppock

C R A EXPLORATION PTY LIMITED		
ARTHUR CREEK - EL 1910		
1:50,000 Scale		
GEOCHEMICAL DRAINAGE		
ASSAY RESULTS - 40# Pb, Zn, Mn, Ag (ppm)		
Reference SF-53 11		
Geologist BEH	Scale 1:50,000	Report No. 10994
Drawn	Date SEPT. 1980	Plan No. NTa 479

Pb
Zn
Mn
Ag

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

383

389

396

377

309

436

452

Yd Norpo Bore

Twins Bore

Yd

Yd

Eur

Coppock

C R A EXPLORATION PTY LIMITED		
ARTHUR CREEK - EL 1910 1:50,000 Scale GEOCHEMICAL DRAINAGE ASSAY RESULTS - 40 # Co, Ni, Cr.		
Reference SF-53 11		
Geologist BEH	Scale 1:50,000	Report No. 10994
Drawn	Date SEPT. 1980	Plan No. NTa 481

Co
Ni
Cr

CR 82/066

136° 00'

136° 9'

22° 35'

22° 40'

374

362

353

305

377

396

383

389

456

482

Yd Norpa Bore

Twins Bore

Yd

Yd

Eur

Coppocks

A

U
Th
Au
As

C R A EXPLORATION PTY LIMITED

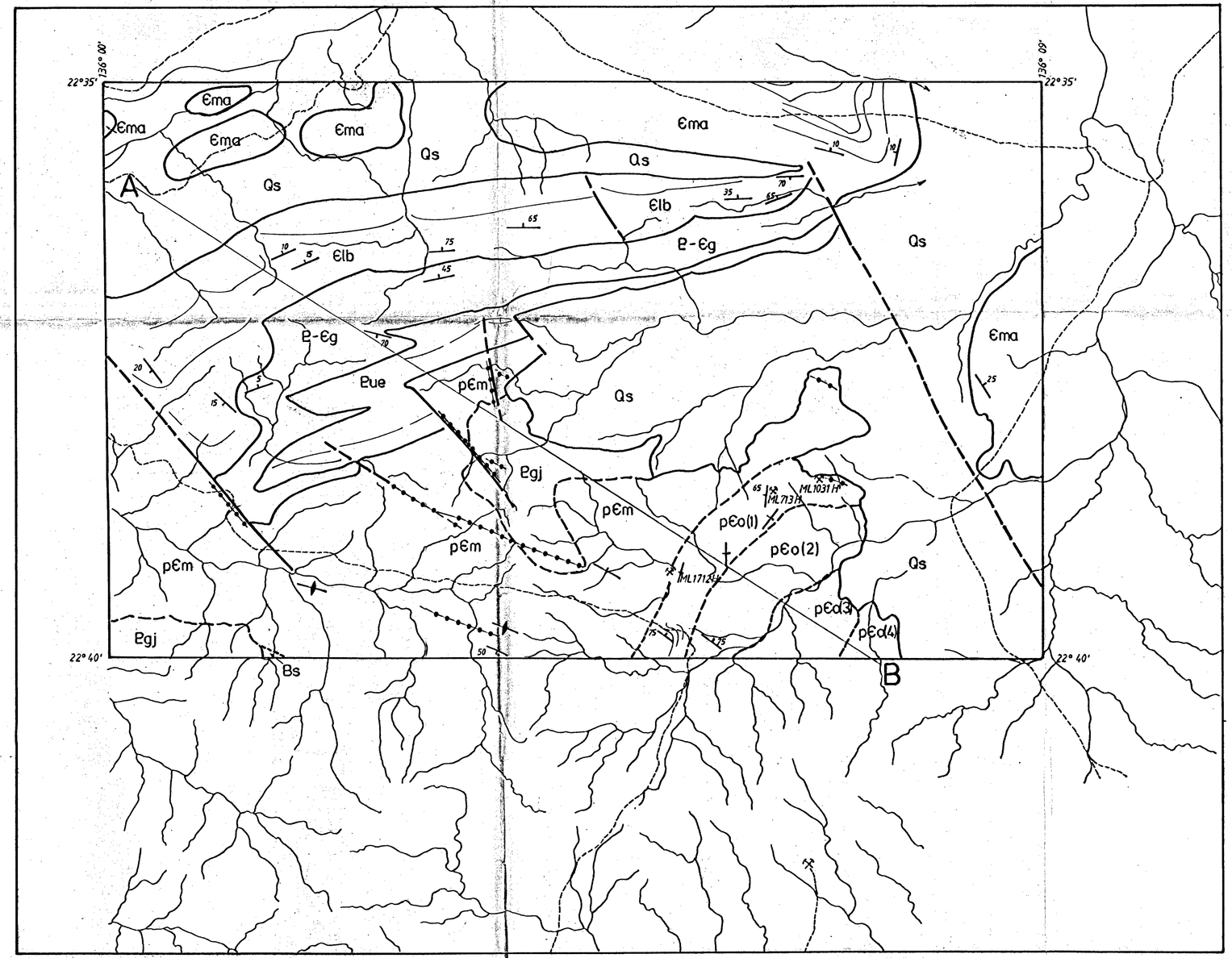
ARTHUR CREEK - EL 1910

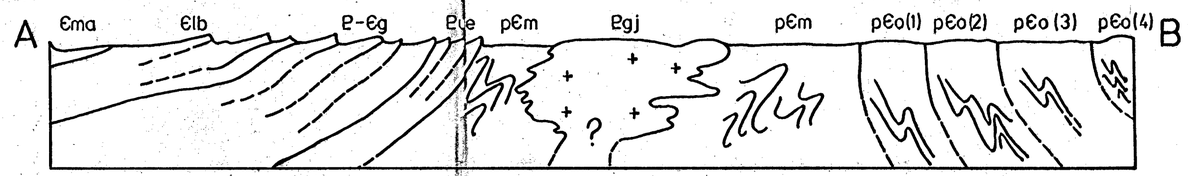
1:50,000 Scale

GEOCHEMICAL DRAINAGE
ASSAY RESULTS -40* U Th Au As

Reference SF-53 11		
Geologist BEH	Scale 1:50,000	Report No. 10994
Drawn	Date SEPT. 1980	Plan No NTa 482

CR 82/066





DIAGRAMATIC CROSS SECTION

REFERENCE

QUATERNARY		Qs	Sand, soil and alluvium.
PALAEOZOIC — MIDDLE CAMBRIAN	ARTHUR CREEK BEDS	Ema	
PALAEOZOIC — LOWER CAMBRIAN TO UPPER PROTEROZOIC	MOPUNGA GROUP — Mt. Baldwin Formation	Elb	Red glauconitic quartz sandstone, red and grey quartz greywacke, red dolomitic siltstone, dolomite.
	MOPUNGA GROUP — Grant Bluff Formation	P-Eg	Grey quartz sandstone, gypsiferous siltstone, dolomite.
	MOPUNGA GROUP — Elyuch Formation	Pue	Arkose, green and red shale.
PRECAMBRIAN	JINKA GRANITE	Pgj	Quartz - feldspar - muscovite granite.
PRECAMBRIAN — LOWER PROTEROZOIC TO ARCHAEN	BONYA SCHISTS	pEo(4)	Argillite, calc - silicate pelite, hornfels.
	BONYA SCHISTS	pEo(3)	Sericite schists, andalusite schist, calc-silicates, amphibolites, quartz magnetic rocks, Banded Iron Formation.
	BONYA SCHISTS	pEo(2)	Muscovite, biotite and andalusite schists.
	BONYA SCHISTS	pEo(1)	Muscovite and biotite schists, epidote calc - silicates, quartz magnatite rods.
	MAISCOTTE GNEISS COMPLEX	pEm	Undiff. felsic gneiss, granite gneiss, amphibolite, pegmatoid.

LEGEND

- Oraabra Reefs
  Quartz haematite breccia dyhes
- FAULT
  known
  inferred
- GEOLOGICAL CONTACT
  known
  inferred
- TREND LINES
- Strike and dip of bedding
  vertical
- Trend and dip of foliation
  vertical

C. R. A. EXPLORATION PTY. LIMITED

ARTHUR CREEK - EL 1910

GEOLOGY

Reference SF 53-11		
Geologist BEH	Scale 1:50,000	Report No. 10996
Drawn SRJ	Date NOV. 1988	Plan No. ATa 693

CR82/066

136° 00'
136° 9'
22° 35'
22° 40'
374
362
353
505
377
396
383
389
456
452
Norpa Bore
Twins Bore
Coppocks
Eur
Yd
Sn
W
Au
Nb
Ta

C R A. EXPLORATION PTY LIMITED		
ARTHUR CREEK - EL 1910 1:50,000 Scale PANNED CONCENTRATES ASSAY RESULTS Sn W Au Nb Ta (ppm)		
Reference SF-53 11		
Geologist BEH	1:50,000	Report No. 10994
Drawn	Date SEPT. 1981	Plan No. NTa 440

CR 82/066.